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file number 14005J1 Task 1

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Over a Century of Engineering Excellence

Schnitzer Steel Industries
Dredging and Disposal
International Terminals
Portland, Oregon

Technical Specifications

Submitted to
Schnitzer Steel Industries

Prepared by

Parsons Brinckerhoff
400 SW 6th Avenue
Portland, OR 97204

September 15, 2004

SCHNITZER STEEL INDUSTRIES
DREDGING AND DISPOSAL
INTERNATIONAL TERMINALS
PORTLAND, OREGON

TECHNICAL SPECIFICATIONS

Table of Contents

DIVISION 1 - GENERAL
Section 01010 – Summary of Work

PART 1 - GENERAL

1.1 SUMMARY

The work consists of dredging and disposal of sediments and possibly some debris using mechanical dredging techniques at locations adjacent to the Schnitzer Steel Industries (SSI) – International Terminals Facility on the Willamette River in Portland, Oregon. This project is a maintenance dredging effort. These specifications provide performance based standards that will govern the work to assure that it is accomplished in a manner that is consistent with the existing permits as well as geotechnical constraints for the site. The total estimated volume of material to be removed is 12,000 cubic yards (cy).

The International Terminals Facility is an active marine terminal supporting metal recycling and vessel dismantling operations. Therefore, shipping operations may require the Contractor to move or shift floating equipment to provide berth access to ships, barges and tug boats. Contractor shall coordinate dredging schedule by providing notice to SSI at least 24 hours in advance.

The Contractor shall complete a Dredging and Disposal Quality Control Plan (as hereinafter defined).

Depending on the landfill selected by the contractor, material to be disposed of at an upland landfill may require dewatering to the point that the material passes the Paint Filter Liquids Test (as hereinafter defined) prior to disposal. Contractor is responsible for documenting compliance with waste acceptance criteria established by the landfill.

All in-water work must be completed by October 31, 2004.

Other than the identified Contractor Staging Area designated in the Construction Drawings, there are no areas within the International Terminals Facility that can be used by the Contractor for staging equipment or conducting construction activities. Areas to be identified by SSI within the International Terminals Facility site can be used as a parking area for Contractor personnel.

1.2 SURVEY INFORMATION

The Contractor shall develop and make such surveys as are needed for construction. Survey work shall be performed under the supervision of a registered professional surveyor or an American Congress on Surveying and Mapping (ACSM) certified hydrographer experienced in the use of single beam hydrographic surveying equipment.

1.3 SPECIAL CONSIDERATIONS

A. The Work includes dredging and handling of sediment that may contain chemicals of concern. Testing has indicated that some of the materials within the dredge area for this project contain chemicals at concentrations exceeding state and federal regulatory limits for in-water disposal of sediments. The Contractor must be familiar with the nature of these chemicals and the hazards they pose to workers. The Contractor must prepare a health and safety plan (SECTION 01063 - HEALTH AND SAFETY) to describe the procedures and equipment to be used to protect human health and the environment.

B. The Work includes operating heavy equipment on land and over water. The Contractor is responsible for worker health and safety and must comply with all applicable laws and regulations related to worker safety and health.

C. The Work involves operations that, if not carefully implemented, have the potential to cause environmental degradation and damage. The Contractor is responsible for selecting all means and methods for conducting the work and shall comply with all applicable local, state and federal laws and regulations concerning environmental protection (SECTION 01560 – ENVIRONMENTAL PROTECTION).

1.4 WORK TO BE PERFORMED BY OTHERS

A. The Owner or its representatives will perform work at the site during this Contract as outlined below:

1. The International Terminals Facility is an active marine terminal and ongoing export and vessel dismantling operations and will require that ships and barges have access to the berth areas.

2. Water quality monitoring will be conducted by the Owner to confirm that the Contractor's activities do not cause exceedances of project-specific water quality criteria approved by the State.

3. The Owner may conduct surveying to verify the accuracy of Contractor surveying activities.

4. The Owner and its representatives will administer the Contract; monitor, observe, approve and accept the Work; and generally ensure that the execution of the Work meets design, construction, and other requirements of the Contract Documents.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

DIVISION 1 - GENERAL
Section 01063 – Health & Safety

PART 1 - GENERAL

1.1 HEALTH AND SAFETY

The most important consideration throughout all aspects of the work to be performed is the health and safety of all on-site personnel and the surrounding community. It is not the intent of the Owner however, to develop, manage, and/or administer the health and safety program of the Contractor or in any way assume responsibility for the health and safety of the Contractor's employees. It is required that the Contractor and any subcontractors adhere to all applicable federal, state, and local health and safety standards.

Accordingly, the Contractor shall develop necessary documents, which contain health and safety criteria procedures and practices sufficient to protect on-site personnel, the environment, and potential human and ecological receptors from the chemical and physical hazards particular to this site. The Contractor shall consider information provided in Appendix C, International Terminals Sediment Data Report which presents the results of chemical analyses of sediments collected from within the area to be dredged under this contract. The Contractor shall also familiarize themselves with the safety requirements of the Owner. If the information made available is insufficient for the Contractor to develop the health and safety documentation, a description of all additional information required shall be prepared by the Contractor and submitted to the Owner's Representative.

A. Health and Safety Plan

A site-specific Health and Safety Plan shall be prepared by the Contractor and submitted to the Owner's Representative prior to commencement of the work. A copy of the Health and Safety Plan shall be available on-site at all times. The Health and Safety Plan shall describe the health and safety procedures, practices, and equipment to be implemented and utilized in order to protect personnel from the potential physical and chemical hazards associated with the tasks to be performed. The level of detail provided in the Health and Safety Plan shall be tailored to the type of work and complexity of operations to be accomplished, and the hazards anticipated. The Health and Safety Plan shall be consistent with state and federal rules and regulations in addition to the safety requirements of the Owner (provided as a part of the Contract Documents).

B. Contaminants of Potential Concern

Chemicals of potential concern in sediment to be removed as a part of this project were assessed as a part of the state and federal permitting process for dredging. Cores representing the thickness of the dredge prism were collected and analyzed for both physical and chemical parameters. The results of these analyses are presented in Appendix C.

1.2 SUBMITTALS

The following shall be submitted to the Owner's Representative within 5 days of the Owner's Authorization To Proceed:

A site-specific Health and Safety Plan

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

DIVISION 1 - GENERAL
Section 01200 – Measurement and Payment

Part 1 – General

1.1 INTRODUCTION

This section describes the method of measurement and the basis for payment for each bid item. Contract price for items listed in the Bid Schedule shall constitute full compensation for furnishing all plant, supervision, labor, materials, equipment, appliances, services, submittals, environmental controls, and incidentals, and performing all operations necessary to construct and complete the items in accordance with these specifications and the applicable Construction Drawings. All work not listed but necessary to complete the work shall be considered incidental work. Each bid item has incidental work associated with it (e.g. all work required for mobilization and demobilization; dredging; sediment handling, transport and disposal; etc.) Some of the incidentals are identified, however, the list may not be complete. The Contractor is responsible for completing the incidental work. Payment for each item shall be considered as full compensation, notwith-standing that minor features may not be mentioned herein. No separate payment will be made for work, services, or operations required by the Contractor as in SECTION 01063: HEALTH AND SAFETY or SECTION 01560: ENVIRONMENTAL PROTECTION to complete the project in accordance with these specifications, and all cost thereof shall be considered as incidental to the work. The Construction Drawings are believed to accurately represent conditions existing at the time the surveys were taken. Determination of quantities removed and deductions made therefrom to determine pay quantities, after having once been made will not be reopened, except on evidence of collusion, fraud or obvious error. Owner may require faulty work not meeting these specifications to be re-done at no extra cost.

1.2 MEASUREMENT

A. Dredging and Disposal

Dredged material excavated (Items 0003) will be measured on a cubic yard basis. Contractor conducted pre-dredge and post-dredge surveys will be used as the basis for determining that dredging occurs within the specified dredge prism and that any excessive overdepth dredging is accounted for. These pre-dredge and post-dredge surveys, once reviewed and accepted by the Owner's Representative, will be used as the basis for payment under Bid Item 0003. No payment will be made for material removed outside the limits of maximum paydepth and side slopes described in PARAGRAPH –**a.:** MINIMUM PAYDEPTH AND MAXIMUM PAYDEPTH, below, unless authorized by the Owner's Representative in writing prior to removal. Proper deductions will be made for misplaced material described in SECTION 02325: DREDGING.

The unit prices for standby or force account (operating) work will be paid in accordance with the hours authorized by the Owner's Representative and verified by the daily equipment logs.

1. Minimum Paydepth and Maximum Paydepth, Side Slopes, and Excessive Dredging

a. Minimum Paydepth and Maximum Paydepth

The minimum paydepth is the minimum acceptable contract depth as shown on the Construction Drawings. The required dredging quantity to be removed above the minimum paydepth (including associated side slopes) is referred to

as the "dredge prism." A 1-foot overdepth allowance beneath the "dredge prism" is allowed to account for inaccuracies in the dredging process. The allowable overdepth is the maximum paydepth. In the event that additional dredging is required after the "dredge prism" has been cleared, the Owner's Representative will direct the Contractor as to the nature and extent of the additional work.

b. Side Slopes

Material actually removed to provide for specified side slopes within the "dredge prism" shown on the Construction Drawings will be measured for payment. In computing the limits of side slope dredging, net dimensions within maximum paydepth side slopes will be used. Material removed below any maximum paydepth elevation as shown on the Construction Drawings will not be measured for payment. In computing the limiting amount of side slope dredging, the allowable overdepth indicated on the Construction Drawings, measured vertically, will be used. Although material lying within 42 feet of the edge of dock in Berth 3 (i.e. dredge area B3) between control points B3.2 and B3.10 is not to be dredged directly (as indicated by the "limits of dredging" shown in the Construction Drawings), it will be measured for payment in the event this material sloughs into the area of active dredging. Likewise material lying within 21 feet of the bulk loader and dolphins in Berth 4 (i.e. dredge area B4) between control points B4.9 and B4.10 is not to be dredged directly. However, this material will be measured for payment in the event it sloughs into the area of active dredging.

c. Excessive Dredging

Material from beyond the limits, as defined in the above paragraphs MINIMUM PAYDEPTH AND MAXIMUM PAYDEPTH and SIDE SLOPES, will be deducted from the total amount dredged, as excessive dredging, and will not be paid for. The Contractor shall be responsible for all costs associated with disposal of the excessive material. Nothing herein shall be construed to prevent measurement and payment for removal of shoals performed in accordance with applicable provisions of PARAGRAPH 3.4: FINAL EXAMINATION AND ACCEPTANCE in SECTION 02325: DREDGING.

2. *Surveys*

Contractor shall survey the site before and after dredging in accordance with PARAGRAPH 3.2: SURVEYS in SECTION 02325: DREDGING. Basis of payment shall be by volume in cubic yards determined by the difference between pre-dredge and post-dredge surveys. In addition, survey information will be used to verify that excavation of the "dredge prisms" has been satisfactorily completed. Survey results must be reviewed and accepted by the Owner's Representative.

a. Surveys During Progress of Work

The Contractor shall be responsible for collecting survey information as the work progresses and for verifying that the prescribed minimum acceptable contract depths are achieved.

Survey results will also be used as the basis to account for any measurement adjustment due to excessive dredging. Re-dredging of the "initial dredge prism" areas to meet the prescribed depths will not be the basis for an increase in the unit price bid for the work. Final survey data shall be provided to the Owner's Representative for approval.

1.3 PAYMENT

A. Mobilization and Demobilization, Bid Item 0001

Payment will be made at the contract lump sum price for mobilization and demobilization of personnel, equipment, supplies, office and other facilities necessary for the work and cleanup. The price shall include the cost of insurance and all other incidentals required. Sixty percent of the lump sum price will be paid upon completion of mobilization to the work site, which will be considered complete when dredging has begun. The remaining 40 percent of the lump sum price will be paid upon final acceptance of the work by the Owner once the equipment is removed from the site.

B. Hydrographic Surveys, Bid Item 0002

The Contractor will provide hydrographic surveys and perform volume calculations for the purpose of determining the existing ground elevations, the extent of the dredging required, monitoring the progress of the work, measurement of dredge volumes, and for verifying the final elevations. The Owner will make payment for these surveys on the basis of 50 percent at the completion of the pre-dredge survey and the balance at the completion and acceptance of the dredging work. Payment for pre-dredge and post-dredge surveys will be made at the contract unit price for Bid Item 0002.

C. Dredging, Dewatering, Transport and Disposal of Material at an Approved Landfill, Bid Item 0003

Payment will be made at the contract unit price for Bid Item 0003 as specified herein, payment of which shall constitute full compensation for furnishing all plant, supervision, labor, materials, equipment, appliances, services, environmental controls, submittals, and incidentals; and performing all operations necessary to complete all work in accordance with these specifications and drawings. Contractor will be held responsible for satisfactory dredging, dewatering if required, transportation, and disposal of dredged material consistent with all applicable permits and requirements specified within this contract. Payment will be made in accordance with the Contract Documents following Owner acceptance of the work. The price and payment therefore shall constitute full compensation for all work including but not limited to dredging; upland transfer; dewatering including moisture conditioning additives [if used]; containment barrier, runoff collection and discharge facilities for a temporary stockpiling/dewatering site [if used], and cleanup/removal of such facilities; transportation; and disposal at an approved upland landfill facility (including tipping fees, taxes and State royalty fees, if applicable).

1. *Bid Item 0003A. Dredge Areas EC-A, B3-A and B4-A*

   Payment for dredging, dewatering, transport and disposal of material dredged from these areas, as shown in the Construction Drawings, will be at the contract unit price for Bid Item 0003A.

2. *Bid Item 0003B. Dredge Areas EC-B, B3-B and B4-B (Owner's Option)*

   Payment for dredging, dewatering, transport and disposal of material dredged from these areas, as shown in the Construction Drawings, will be at the contract unit price for Bid Item 0003B. This Bid Item represents an Owner's Option and may or may not be required. In addition, the Owner may elect to dredge only a portion of these areas.

D. Additional Hydrographic Survey, if Required, Bid Item 0004

If additional dredging is required, the Contractor will be directed by the Owner's Representative to conduct another post-dredge hydrographic survey after the additional dredging is completed. Survey work will proceed in the same manner as for the post-dredge survey conducted according to Bid Item 0002. The survey work will be paid at the contract bid rate of Bid Item 0004. Payment will be made in accordance with the Contract Documents following Owner acceptance of the work.

E. Hourly Operating Rates

The Owner's Representative may direct the Contractor to assist in verification of the completed project. In addition, the Owner's Representative may direct the Contractor to do additional dredging to remove sediment, debris or other materials. It is anticipated that equipment necessary to conduct additional dredging and related material disposal may include a suitable mechanical dredge, a digging bucket, an environmental bucket, a suitable tugboat, a flat deck barge, equipment necessary for possible application and mixing of moisture conditioning additives and equipment necessary for transport and disposal of dredged material. Variations of this equipment will be at the Contractor's discretion and Owner's Representative approval. The unit prices for force account work will be paid in accordance with the hours authorized by the Owner's Representative and verified by the daily equipment logs. Payment for this work will be at the hourly rate per piece of equipment in accordance with the rate sheet provided by the Contractor and as approved by the Owner's Representative. The hourly rate shall include equipment rental, labor, and operating expenses. Payment will be made in accordance with the Contract Documents following Owner acceptance of the work.

F. Hourly Standby Rates

After notification by the Contractor that the required dredging has been completed, the Owner's Representative will review the post-dredge survey and verify that excavation of the "dredge prism" has been satisfactorily completed. If dredging operations are interrupted due to the movement of Owner controlled vessels or floating equipment or if the Owner directs an interruption for his convenience, the Contractor may be required to standby until such time as the Contractor is given permission to proceed. However, during an interruption of operations caused by vessel movement, if the Contractor has access to

other locations on the project area where the work is not completed and permission to proceed has already been granted from the Owner, no compensation will be provided under standby. Payment will be made on an hourly basis per piece of equipment in accordance with the rate sheet provided by the Contractor for standby and as approved and directed by the Owner's Representative. The unit prices for standby work will be paid in accordance with the hours authorized by the Owner's Representative and verified by the daily equipment logs. The maximum standby time paid is 8 hours per calendar day. Payment will be made in accordance with the Contract Documents following Owner acceptance of the work.

The Contractor shall not be compensated if the Owner's Representative directs the Contractor to suspend work because water quality parameters are outside of allowable limits.

G. Final Payment

Final payment will be made based on the contract unit prices for work performed and completed in accordance with these specifications and the Construction Drawings. Final payment will be subject to deductions for work already paid and for corrections or deductions made on account of excessive dredging, dredging outside of authorized areas, or sediment disposed of in an unauthorized manner. No payment will be made for dredging outside the limits and depths prescribed unless authorized in writing by the Owner's Representative. Final acceptance of all or part of the work will be in accordance with PARAGRAPH 3.4: FINAL EXAMINATION AND ACCEPTANCE in SECTION 02325.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

DIVISION 1 - GENERAL
Section 01560 – Environmental Protection

PART 1 - GENERAL

1.1 SUMMARY

This Section covers prevention of potential environmental degradation and damage that may result from construction operations under this contract.

1.2 APPLICABLE REGULATIONS

Contractor shall comply with all applicable local, state, and federal laws and regulations concerning environmental pollution control and abatement.

1.3 ENVIRONMENTAL PERMITS

The Owner has obtained permits, approvals, and certifications for this project as listed below. The Contractor shall be responsible for adhering and conforming to all provisions, conditions, and requirements of these permits and shall plan and conduct all construction operations accordingly. Copies of project permits are provided in Appendix B.

A. Permits, Approvals, and Certifications

1. U.S. Army Corps of Engineers Section 10/404 Permits. Permit No. 199100099 applies to berths 1, 2, and 3 in the slip and the entrance channel. Permit No. 199200812 applies to berths 4 and 5 in the river. A City of Portland representative signed the affidavit on the joint Federal and State permit application indicating local approval provided the materials are not disposed upland within the city limits. Two federal permits are included in Appendix B. However, only one set of Attachments No. 2 through 4 are included since these attachments were identical for both permits. Attachments No. 2 through 4 apply to both permits.

2. State Removal Permits.

The Contractor is responsible for obtaining any other permits required to perform the work.

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

3.1 AIR POLLUTION CONTROL

The Contractor shall not discharge smoke, dust, or other contaminants into the atmosphere at levels greater than limits established by federal, state, and local regulations and authorities.

3.2 WATER POLLUTION CONTROL

The Contractor shall prevent oily or hazardous substances from entering the ground, drainage areas, or surface water. The Contractor shall provide secondary containment for all fuel, oil, or petroleum storage containers.

3.3 PROVISIONS FOR FISH CONSIDERATION

No toxic material or petroleum product shall be washed into or permitted to enter waters of the State. At all times in performance of the work, steps shall be taken to prevent interference or disturbance to safe passage to spawning areas of anadromous and other fish. The Contractor shall perform visual observation in the dredging and open-water disposal area. If any distressed or dead fish is observed, the Contractor shall stop work and immediately notify the Owner's Representative.

3.4 PROVISIONS FOR WATER QUALITY

All operations shall be conducted so as to minimize turbidity and dispersal of material in the water. A compliance boundary has been established extending 150 feet radially from the approximate edge of the proposed dredge areas as shown in the Water Quality Monitoring Plan (the appendix of the Water Quality Certification which is Attachment No. 2 of the Federal Permits in Appendix B of these specifications). Within the compliance boundary, the water quality standard for turbidity is waived. Water quality criteria to be met outside the compliance boundary are provided in the Water Quality Monitoring Plan located in Appendix B of these specifications as noted above.

The Owner will perform water quality monitoring during construction operations carried out under this contract. The Owner's Representative, or a delegate, will order the Contractor to suspend in-water activities if water quality monitoring results indicate that water quality is outside allowable ranges. The Contractor will be notified when water quality conditions allow construction operations to be re-initiated.

Best Management Practices (BMPs) for dredging, dewatering and transport of material have been established and shall be implemented. The BMPs are listed in PARAGRAPH 3.3: CONDUCT OF DREDGING WORK in SECTION 02325. Per federal permit requirements in Appendix B, Contractor shall report on a daily basis (i.e. PARAGRAPH 3.1B DAILY REPORTING REQUIREMENTS in SECTION 02325) all occurrences including start time, duration and location associated with the use of any bucket other than the "environmental clamshell bucket that is closed, vented, and sealed".

3.5 NOISE POLLUTION

The project is located within an industrial area. Contractor shall assure that noise levels attributable to construction operations do not exceed levels allowed by local Noise Ordinances.

END OF SECTION

DIVISION 2 – SITE WORK
Section 02325 – Dredging

PART 1 - GENERAL

1.1 SCOPE OF WORK

In the area to be dredged, materials shall be removed and disposed of as indicated. The intent of the work is maintenance dredging. The "dredge prisms," as shown in the cross sections on the Construction Drawings, shall be dredged except for portions of the side slopes as noted in the Construction Drawings.

A. Dredge Prisms

The "dredge prism" areas are depicted in the cross sections on the Construction Drawings. The "dredge prisms" shall be dredged to the indicated depths below Columbia River Datum (CRD). The estimated dredging quantity including side slopes and 50% of the allowable overdepth material is 12,000 cy. These materials will be excavated from Dredge Areas B3, B4 and EC with a mechanical dredge, loaded onto barges and dewatered and/or transferred upland and placed in a temporary stockpile/dewatering site, dewatered, transported to and disposed of at an approved landfill. Dredged material may be dewatered solely on barges if the required water content can be achieved.

B. Additional Dredging (if required)

If additional dredging is required, the Contractor will be directed by the Owner's Representative as to the extent. Unless otherwise directed, dredging and disposal operations for additional dredging will proceed in the same manner as for the "dredge prisms." Additional dredging will be paid in accordance with Contractor's Hourly Operating Rates.

C. Additional Surveys (if required)

If additional dredging is required as per the above paragraph, the Contractor will be directed by the Owner's Representative to conduct a revised post-dredge hydrographic survey after the additional dredging is conducted. Survey work will proceed in the same manner as for the "dredge prisms." The survey work will be paid at the contract bid rate per Bid Item 0004.

1.2 SUBMITTALS

Except as noted, the following shall be submitted to the Owner's Representative within 5 days of the Owner's Authorization to Proceed:

A. Dredging and Disposal Quality Control Plan

B. Survey Plan and Equipment Description

C. Survey Deliverables

D. Daily Report of Operations on form approved by Owner's Representative (submit at the start of work on the day after the date of the report)

E. Certified Weight Tickets for Material Transported to Upland Landfill (submit within 2 days of actual disposal date)

1.3 MATERIAL TO BE REMOVED

The International Terminals Slip was man-made in the early 1940's. Sediments to be removed are described in Appendices C and D. Sediments appear to be primarily sands and silts and, in some locations, small amounts of clay. Other materials to be removed by dredging include the types of debris that may be expected in urban, industrialized waterways (e.g., tires, trash, metallic debris, submerged logs, wire cable, chains, etc.).

1.4 ARTIFICIAL OBSTRUCTIONS

A. Submarine Cables, Utilities

The Owner is not aware of any submarine cables, pipes or other artificial obstructions within the dredging area. If the Contractor encounters any submarine cables, pipes, or other artificial obstructions within the dredging area, it is the Contractor's responsibility to notify the Owner's Representative immediately before removing or damaging such installations.

B. Existing Waterfront Structures, Piers, Docks, Wharves, and Revetments

The Contractor shall conduct dredging operations in this area in such a manner as to prevent undermining of the existing waterfront structures including piers, docks and wharves, revetments, outfalls and other structures. Excessive or unnecessary dredging may result in an unstable condition at the toe of these structures. The Contractor will be required to strictly adhere to the indicated dredge prism when working near any structures, and shall be responsible for repairing any damage that may result from failure to comply with the requirements of these specifications.

1.5 QUANTITY OF MATERIAL

The estimated amount of material to be removed within the specified contract limits for the Base Bid, including side slopes and an assumed 50 percent removal of the allowable 1 foot of overdepth below contract depths, is 12,000 cubic yards. Overdepth dredging will be allowed to the limits specified in PARAGRAPH 1.6: OVERDEPTH DREDGING and PARAGRAPH 1.8: EXCESSIVE DREDGING. Payment will be by the cubic yard, based on pre-dredge and post-dredge surveys.

1.6 OVERDEPTH DREDGING

To cover unavoidable inaccuracies of the dredging process, overdepth removal of dredged material to a depth of not more than 1.0 feet below the minimum required project depth and within the dredging limits will be measured and paid for at full contract price. Dredging in excess of the overdepth tolerance shown on the Construction Drawings will be excluded from the measurement of work.

1.7 SLOPES

Side slopes and end slopes, where indicated on the Construction Drawings, consist of materials that are assumed to have a natural angle of repose. Dredging shall be limited to areas within the "dredge prism" as shown on the Construction Drawings. Dredging at the edge of the "limits of dredging" shown on the Construction Drawings will allow slope material to slough into the dredge prism, resulting in a slope governed by the materials natural angle of repose. A cleanup pass may be required to dredge sloughed material from the toe of slope areas prior to the time when the "dredge prisms" are accepted.

The Contractor shall remove sideslope materials beginning from the top of the dredge slope and working progressively toward the toe of the "dredge prism" as shown in the Construction Drawings so as not to create slopes steeper than 3.5 horizontal on 1 vertical. Some areas within the "dredge prisms" have dredge cuts in excess of 3 feet vertically. The Contractor shall not create slopes steeper than 3.5 horizontal to 1 vertical anywhere in the dredge area except as follows: a maximum vertical cut of up to 3 feet is acceptable provided at least 10.5 horizontal feet separate every such 3 foot vertical cut as shown in the Construction Drawings. Irrespective of the sideslope removal methods used by the Contractor, acceptance and payment will be governed by the minimum acceptable contract depth and maximum paydepth lines shown in the Construction Drawings, respectively.

1.8 EXCESSIVE DREDGING

Material taken from beyond the allowable overdepth limits will be deducted from the total amount dredged as excessive overdepth dredging. Materials dredged from below the allowable overdepth depth limit, which result in extra costs of dredging and disposal, shall be the responsibility of the Contractor. If the Contractor exceeds this volume due to excavation below the maximum paydepth, the Contractor shall be responsible for the cost of disposing of excess material to a site and in a manner approved by the Owner.

1.9 PERMITS

The Contractor shall comply with conditions and requirements of the Corps of Engineers Section 10/404 Permits, the City of Portland approval (provided material is not placed upland within city limits), and the State Removal permits (Appendix B). In the event the Contractor elects to create and/or use an existing upland sediment dewatering/transfer site, the Contractor is responsible to secure all applicable permits needed for the construction and operation of the site.

1.10 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

A. U. S. Army Corps of Engineers (USACE) Section 10/404 permits (Appendix B)

B. Oregon Department of Environmental Quality 401 Water Quality Certification (Appendix B)

C. Oregon Division of State Lands Removal permits (Appendix B)

D. USACE EM 1110-2-1003 (October 1994) Hydrographic Surveying

E. Paint Filter Liquids Test (EPA Method 9095A, Revision 1, December 1996)

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

3.1 QUALITY CONTROL

A. Dredging and Disposal Quality Control Plan

At least 5 days prior to scheduled dredging operations, the Contractor shall submit to the Owner's Representative for approval a written Dredging and Disposal Quality Control Plan. This plan is anticipated to be very similar, if not identical, to the Technical Work Plan prepared by the Contractor during the bidding phase of this contract.

The Dredging and Disposal Quality Control Plan shall include procedures and equipment to be used to dredge, dewater, transport, and dispose of materials; monitor dredging and conduct progress surveys. The plan shall also include a description of the equipment to be used; the sequence of the dredging work; the methods to handle, dewater and transport material; prevent losses in transit; unload and dispose of materials; plans for compliance with environmental protection requirements (SECTION 01560) and permits; and proposed schedule for executing the work. A list of key personnel and supervisory chain of command shall be included. The plan shall describe the frequency and location of testing to confirm and document that acceptable moisture contents have been achieved, if needed. Contingent plans to be used to further dewater materials exceeding moisture content requirements shall also be presented.

The Dredging and Disposal Quality Control Plan will include procedures to be used to document the inspections, monitoring, surveys and other actions to be taken by the Contractor to ensure that the work complies with all contract requirements.

The Contractor may be required to modify the Dredging and Disposal Quality Control Plan, as required by the Owner's Representative. The Contractor shall not receive additional compensation for these modifications.

All aspects of the work will be executed in accordance with the approved Dredging and Disposal Quality Control Plan.

B. Daily Reporting Requirements

The Contractor shall prepare and maintain a daily report of operations and furnish a copy to the Owner's Representative at the start of work on the day after the date of the report. At a minimum, information to be included in the report will be the date; period covered by the report; equipment used; description of activity as identified by dredge area and coordinates; quantity of sediments and debris dredged that day and to date; quantity of material placed

into the upland transfer site; quantity and type of dewatering agents used; downtime and delays to the operation; cause of downtime and delays; health and safety performance; and other relevant comments concerning the conduct of the operation. In addition, per federal permit requirements in Appendix B, Contractor shall report all occurrences including start time, duration and location associated with the use of any bucket other than the "environmental clamshell bucket that is closed, vented, and sealed". The report shall include the results of all inspections, surveys and monitoring activities and shall be signed by the Contractor's dredging superintendent or quality control manager.

C. Inspection

The Contractor shall furnish, at the request of the Owner's Representative, boats, boatmen, laborers, and materials necessary for inspecting, supervising, and surveying the work. When required, the Contractor shall provide transportation for the Owner's Representative and inspectors and, as appropriate, agency personnel, between adjacent points on shore and the dredging plant.

3.2 SURVEYS

All hydrographic surveys are to be conducted under the direct supervision of a Contractor hired registered professional surveyor or American Congress on Surveying and Mapping (ACSM) certified hydrographer experienced in the use of singlebeam survey equipment.

A. Surveys

Hydrographic surveys will be used to document initial conditions prior to work and at completion of the work as a basis for acceptance and measurement to determine payment. These include a pre-dredge survey, a post-dredge survey, and any additional surveys required under Bid Item 0004.

The pre-dredge survey will be performed after award of the Contract. After dredging the "dredge prism" as indicated on the Construction Drawings and described under PARAGRAPH 1.1A: DREDGE PRISMS, the Contractor-hired surveyor shall conduct a post-dredge survey to document completion of the required dredging as well as quantities of material dredged.

The post-dredge survey shall be used as the basis for determining acceptance for completion of the "dredge prism" portion of the work as well as payment based on volume of material dredged.

B. Bathymetric Equipment and Methods

For pre-dredge and post-dredge surveys depth soundings shall be made using singlebeam hydrographic surveying equipment. Volume calculations shall be based on a Triangulated Irregular Network (TIN) representation of the hydrographic surveys that are developed from a grid of not more than 3 feet between adjacent reported depths along each transect. Each transect shall not be more than 25 ft apart and these transects shall be established perpendicular to the toe of the post-dredge slope in order to document breaklines at the toe of slope and the dredge prism catchline (i.e. intersection of the maximum paydepth line and

the existing mudline). The pre-dredge surveys shall cover the entire area indicated by the "dredge prisms," side slopes, and estimated dredge catchlines shown in the Construction Drawings. The pre-dredge and post-dredge surveys shall extend at least 40 ft beyond the "dredge prism" as proposed (pre-dredge) and as impacted (post-dredge).

Bed elevations converted to the Columbia River Datum (CRD), shall be determined using depth soundings and river gauge readings. Water level and other corrections shall be applied and the corrected depth shall be shown on survey sounding sheets referenced to CRD. Accuracy for measured depths shall be ±0.3 feet; accuracy of horizontal position shall be ±5 feet. Survey plan and equipment description shall be submitted to the Owner's Representative for approval prior to conducting the initial survey. Once approved, the same method shall be used for subsequent surveys.

C. Deliverables

The following deliverables (if applicable) shall be provided to the Owner's Representative for surveys conducted under Bid Items 0002 and 0004:

1. Contour map with a contour interval of 1 foot in a format consistent with the Construction Drawings. The contour map shall include all base map and dredge prism information included on the Construction Drawings as well as indicators showing the location of cross sections included in Item No. 2 below. Two hard copies and an electronic ACAD file (Version 2002) shall be submitted to the Owner's Representative. Hard copies of contour maps shall be submitted in 1-inch equals 50 feet scale on D-sized sheets.

2. Cross Sections in a format consistent with the Construction Drawings including all base map and dredge prism information included on the Construction Drawings. Cross Sections shall be provided every 25 feet along each dredge area defined in the Construction Drawings. Cross sections shall be shown every 25 ft along the following lines associated with the Control Points: EC.5-EC.6-EC.7, B3.2-B3.3-B3.4 and B4.12-B4.1-B4.2. Cross sections shall extend at least 40 feet beyond the estimated catchlines (i.e. intersection of the maximum paydepth line and the existing mudline) shown in the construction drawings. The first and last cross section shown for each dredge area shall be at least 25 ft beyond the limits of area affected by dredging including estimated (pre-dredge) and actual (post-dredge) slope catchlines defined by the intersection of the maximum paydepth line and the existing mudline as shown in the Construction Drawings. Two hard copies and an electronic ACAD file (Version 2002) shall be submitted to the Owner's Representative. Hard copies of cross sections shall be submitted in 1-inch equals 20 feet scale on D-sized sheets.

3. An electronic ASCII data file with x,y,z soundings reported on grid spacing of no more than 3 feet between data points along each transect shall be provided for each survey.

4. The volume of material removed from the dredge areas shall be calculated and submitted with the post-dredge survey. The dredge material volume removed from Dredge Areas EC-A, EC-B, B3-A, B3-B, B4-A and B4-B shall be reported

separately. Excessive dredging quantities, if any, shall be calculated and reported for each of the dredge areas.

3.3 CONDUCT OF DREDGING WORK

A. Excavating Dredge Prisms

The Contractor shall excavate the "dredge prisms" to the lines, grades, slopes and elevations shown within the "limits of dredging" on the Construction Drawings or as directed by the Owner's Representative. The Contractor shall pay particular attention to the conditions of issued permits and authorizations requiring minimizing turbidity and siltation and adherence to water quality requirements.

In order to minimize water quality impacts during dredging the Contractor shall use "Best Management Practices" (BMPs) to minimize resuspension and loss of fine-grained sediments during mechanical dredging and return of dredged water from the barges to marine waters.

At a minimum, the Contractor shall adhere to the following BMPs to reduce dredging induced resuspension of sediment per the Water Quality Monitoring Plan in Appendix B:

1) Dredging BMP's

   a) The Contractor will ensure that no fuel, garbage, or debris enters the waterway from the dredge, receiving barge, other vessels associated with the project.

   b) Dredging will be conducted using an environmental clamshell bucket that is closed, vented, and sealed in order to minimize the release and redistribution of dredged material to the water column during dredging. In the event that large woody debris or other obstructions must be removed from the dredge prism, the environmental clamshell bucket may be modified and/or replaced with a bucket suitable for removing obstructions and/or debris while still meeting project water quality requirements.

   c) Dredging will be conducted using procedures that will minimize potential impacts to water and sediment quality to the extent practicable. These procedures include the following:

      i) Slow dredge bucket deployment and retrieval will be required. The maximum rate of retrieval of the dredge bucket will be 2 feet per second for the first 20 feet off the bottom (where the highest potential for bottom sediment disturbance exists). For the remainder of the bucket ascent, the rate may increase up to a maximum of 4 feet per second.

      ii) The maximum rate of bucket descent will be 10 feet per second and the descent rate will decrease significantly until stopped at the designated depth of digging penetration.

      iii) "Sweeping" the post-dredge surface to smooth contours will not be allowed.

      iv) Stockpiling of material on the bottom will not be allowed (i.e., each time the bucket is closed it will be brought to the surface).

v) The bucket will be required to pause for several seconds at the water surface during retrieval to release excess water.

d) Barges and other floating equipment shall be operated to avoid grounding on the riverbed or banks at any time.

The Owner will conduct water quality monitoring to demonstrate compliance with project-specific water quality requirements (defined in PARAGRAPH 3.4: PROVISIONS FOR WATER QUALITY in SECTION 01560: ENVIRONMENTAL PROTECTION). The Contractor shall modify or suspend work at the direction of the Owner's Representative, if water quality requirements are exceeded. The Contractor shall not be compensated if the Owner's Representative directs the Contractor to suspend work because water quality parameters are outside of allowable limits.

Burying of logs or other debris is prohibited.

The Contractor shall make the cut to the grades shown on the Construction Drawings. As noted in the Construction Drawings, sideslope materials are not to be actively dredged south of the line between control points B3.2 and B3.10 nor shoreward of the line between control points B4.9 and B4.10. These two lines correspond to the "limits of dredging" shown in Section A-A for Berth 3 and Section B-B of Berth 4. As work progresses, it is anticipated that slope material may slough into the edge of the dredge cut area along these lines corresponding to the "limits of dredging". The Contractor shall remove this material and will make a final pass with the dredge along the "limits of dredging" between control points B3.2 and B3.10 in Berth 3 and points B4.9 and B4.10 in Berth 4 prior to the time when the "dredge prism" is measured for acceptance.

B. Additional Dredging (if required)

If additional dredging is required, the Contractor will be directed by the Owner's Representative as to the nature and extent. Dredged material will be transported to and disposed of at an approved upland disposal facility. Additional dredging will be paid at the hourly operating rates included in Contractor's Rate Sheet.

C. Dewatering of Dredged Material

Depending on the facility, material to be disposed of to an upland landfill may require removal of free liquids as determined by the Paint Filter Liquids Test (EPA Method 9095A, Revision 1, December 1996). The Contractor shall be responsible for dewatering materials to the extent required and for conducting and documenting test results per the selected disposal facility. The type(s) and frequency of testing shall comply with the applicable landfill waste acceptance criteria. Two dewatering alternatives are presented below. However, Contractor may propose an alternative methodology for Owner's Representative review provided it complies with all permit requirements.

1. Dewatering on Barge

If Contractor dewaters sediment on a barge the Contractor shall, at a minimum, adhere to the following BMPs to reduce dewatering induced resuspension of sediment per the Water Quality Monitoring Plan in Appendix B. However,

Contractor may propose an alternative methodology or BMPs related to dewatering on a barge, for Owner's Representative review and consideration, provided they comply with all permit requirements:

(a) Barge Dewatering BMPs

(i) Return water draining from the receiving barge will be treated by filtering water through straw bales and/or geotextile fabric before returning to the waterway.

(ii) Straw bales and geotextile fabric will be changed regularly to ensure efficient filtration of the return water.

(iii) Barges will not be overfilled to the point where recovered material, including both sediment and water, overflows directly back to the waterway.

(iv) During sediment dewatering, the receiving barge will remain within the project area.

(v) Return water from the barge will not be allowed to discharge to the waterway outside the project area (e.g., during transport to, or while stationed at the transload facility).

2. *Temporary Stockpile/Dewatering Site*

If deemed necessary by the Contractor, the dredged material may be transferred upland and placed in a temporary stockpile/dewatering site to be identified in coordination with the Owner's Representative. The Contractor is responsible for any and all additional permits that may be required for construction and operation of such a facility. Dewatering agents, if used at this site, must also be stored within this area. The temporary stockpile/dewatering site shall be placed on a paved surface or impermeable liner of polypropylene or similar material and enclosed by a suitable barrier ("Ecology" blocks or similar). Care shall be taken to prevent material spillage during transfer of material via the "upland transfer sites" into or out of the temporary stockpile/dewatering site and any spillage outside of these contained areas shall be promptly cleaned up. Upon completion of the work, the contractor shall remove all vestiges of dredged materials, barrier materials, liners, pumps, and other materials and cleanup the site to the pre-project condition.

Due to ongoing operations at the International Terminals Facility, the Contractor will be required to coordinate upland transfer operations with Owner operations (via the Owner's Representative). The Contractor may be required to shift or move floating equipment to provide berth access to ships or barges.

3. *Return Water*

Water that drains from the dredged material while within the upland transfer site(s) or the temporary stockpile/dewatering site(s) shall be allowed to settle or be filtered as necessary to meet the project-specific water quality requirements at the compliance boundary (defined in PARAGRAPH 3.4 PROVISIONS FOR WATER QUALITY in SECTION 01560: ENVIRONMENTAL PROTECTION) before being discharged back into the waterway. However, Contractor may propose an alternative methodology for Owner's Representative review and consideration provided it complies with all permit requirements.

D. Transportation and Disposal of Material

The Contractor shall utilize appropriate controls to prevent any loss of dredged material during transport. Special care shall be taken to prevent spillage into water, onto Owners property or other private property or onto any public or private roadways. Any such spillage, whether to water or upland areas shall be promptly cleaned up at no additional cost to the Owner.

Pre-approved disposal locations for the dredged material are listed below:

1. Columbia Ridge Landfill
   18177 Cedar Springs Lane
   Arlington, Oregon 97812
   Mr. Mark Krenning (503) 493-7827

2. Roosevelt Regional Landfill
   500 Roosevelt Grade Road
   Roosevelt, Washington 99356
   Ms. Elisa Webb (360) 697-5968

The Contractor shall make arrangements for transportation and disposal of the dredged material with the upland disposal facility operator. The Contractor is responsible for all aspects of the dewatering, transportation and disposal of dredged material, and for documenting compliance with waste acceptance criteria established by the landfill. The Owner must approve any alternate disposal location, in writing. Any dredged material that is deposited other than at the approved disposal locations referenced herein, or otherwise approved by the Owner's Representative in writing prior to disposal, will not be included in the measurement for payment, and the Contractor may be required to remove such misplaced material and deposit it where directed at its own expense.

Contractor shall adhere to the following BMPs to reduce loss and re-distribution of dredged material per the Water Quality Monitoring Plan in Appendix B:

1) Transportation and Disposal BMPs

   a) The clamshell bucket used during sediment offloading will not be allowed to swing directly over open water. A protective "capture barge", temporary structure, or spill apron will be placed along the swing pathway of the bucket to prevent material from entering the waterway.

   b) Railcars or containers used to transport dredged sediment will be lined with impermeable liners prior to being filled.

   c) The transload facility will be swept regularly to prevent potential spreading or release of sediment.

   d) Sediment will be removed from the outside of equipment and railcars by brushing or sweeping prior to leaving the transload facility.

E. Interference with Navigation

Ongoing operations at the International Terminals Facility may require the Contractor to shift or move dredging and other attendant floating equipment to provide berth access to ships or barges.

1. Compensation for Interruption of Operations

If dredging operations are interrupted due to the movement of Owner controlled vessels or floating equipment or if the Owner directs an interruption for his convenience, payment will be made at the established Hourly Standby Rates until such time as the Contractor is given permission to proceed. However, during an interruption of operations caused by vessel movement, if the Contractor has access to other locations on the project area where the work is not completed and permission to proceed has already been granted from the Owner, no compensation will be provided under standby. In this case compensation for relocation of equipment will be provided based on the established Hourly Operating Rates.

If known, the Owner's Representative will notify the Contractor 1 day prior to ship movements that will affect dredging operations.

F. Lights

Each night, between sunset and sunrise and during periods of restricted visibility, Contractor shall provide lights for floating plants, ranges, and markers. Contractor shall also provide lights for buoys that could endanger or obstruct navigation. When night work is in progress, maintain lights from sunset to sunrise for the observation of dredging operations. Lighting shall conform to USCG requirements for visibility and color.

G. Ranges, Gages, and Lines

Furnish, set, and maintain ranges, buoys, and markers needed to define the work and to facilitate inspection. Establish and maintain tide boards or gages in locations observable from each part of the work so that the depth may be determined. Suspend dredging when the gages or ranges cannot be seen or followed.

H. Plant

Maintain the plant, haul barges, and associated equipment to meet the requirements of the work. Promptly detect and repair leaks or breaks on haul barges or other dredged material conveyances. Remove dredged material placed due to leaks and breaks.

I. Method of Communication

The Contractor shall provide a system of communication between the dredge crew and attendant tugboats and other Contractor manned floating plants. A portable two-way radio is acceptable.

J. Salvaged Material

Anchors, chains, firearms, and other articles of value, which are brought to the surface during dredging operations, shall remain or become the property of the Owner and shall be deposited on shore at a convenient location near the site of the work, as directed by the Owner's Representative.

K. Safety of Structures

The prosecution of work shall ensure the stability of piers, bulkheads, and other structures lying on or adjacent to the site of the work, insofar as dredging operations may jeopardize structures. The Contractor shall repair damage resulting from dredging operations, insofar as such damage may be caused by variation in locations or depth of dredging, or both, from that indicated or permitted under the contract.

L. Equipment Removal

Upon completion of the work, the Contractor shall promptly remove all equipment, including ranges, gages, buoys, piles, and other markers or obstructions.

3.4 FINAL EXAMINATION AND ACCEPTANCE

A. Dredge Prism Acceptance

As soon as practicable after the complete excavation of the "dredge prism," the Contractor's surveyor will survey the site, and present the survey results to the Owner's Representative. The Owner's Representative will be notified when a survey is to be conducted, and will be permitted to accompany the survey party. The Owner's Representative will conduct an examination of the work within 24 hours of receiving the survey data. Should any shoals, lumps, or other lack of achieving minimum acceptable contract depth be disclosed by this examination, the Contractor will be required to remove same at the contract unit price for dredging. However, the Owner's Representative reserves the right to waive the removal of minor shoals.

Should additional sounding operations over an area be necessary by reason of work for the removal of shoals disclosed at a prior sounding, the cost of such subsequent sounding operations will be the responsibility of the Contractor.

When the "dredge prism" is found to be complete and in satisfactory condition, it will be accepted.

B. Final Acceptance

Final acceptance of the whole or a part of the work and the deductions or corrections of deductions made thereon will not be reopened after having once been made, except on evidence of collusion, fraud, or obvious error, and the acceptance.

END OF SECTION

APPENDIX A – BID SCHEDULE

BID SCHEDULE

The Bid Schedule includes Bid Items 1 through 4. The work of each Bid Item is specified or shown in the contract documents and described further in *SECTION 01200 – MEASUREMENT AND PAYMENT*. The bidder shall offer a lump sum or unit price, as applicable, for each Bid Item on the Bid Schedule. Each unit price shall be shown in figures. Each unit price shall be multiplied by the estimated quantity to calculate an extended amount for that Bid Item. The bidder shall set forth a Total Bid Price, which shall be the sum of the lump sum amounts and extended amounts for all Bid Items.

ITEM	DESCRIPTION	UNITS	EST. QTY.[1]	UNIT PRICE	TOTAL
0001	Mobilization and Demobilization	Lump sum	1	$_____	$_____
0002	Hydrographic Surveys	Lump sum	2	$_____	$_____
0003	Dredging, Dewatering, Transport and Disposal of Material at an Approved Landfill				
	A. Dredge Areas EC-A, B3-A and B4-A	Cy	10,700	$_____	$_____
	B. Dredge Areas EC-B, B3-B and B4-B (Owner's Option)	Cy	1,300	$_____	$_____
0004	Additional Hydrographic Survey, if Required	Each	1	$_____	$_____
Total Bid Price (Sum of the lump sum amounts for Bid Items 1 through 4):					$_____

[1] ESTIMATED QUANTITIES ARE FOR BID COMPARISON ONLY. ESTIMATED QUANTITIES ARE NOT GUARANTEED, MAY BE GREATER OR LESSER THAN SHOWN, OR MAY BE ZERO. THE UNIT PRICE BID WILL APPLY REGARDLESS OF THE ACTUAL QUANTITY.

Name of Firm

Signature | By (type or print) | Title

Business Address | City | State | Zip

Telephone Number | Fax Number

Oregon State Contractor's License No. _____

Date of Issue _____ Expiration Date _____

APPENDIX B – OWNER OBTAINED PERMITS, CERTIFICATIONS, AND APPROVALS

DEPARTMENT OF THE ARMY
PORTLAND DISTRICT, CORPS OF ENGINEERS
POST OFFICE BOX 2946
PORTLAND, OREGON 97208-2946

PARSONS BRINCKERHOFF
APR 22 2004
5582

REPLY TO
ATTENTION OF:

APR 21 2004

Operations Division
Regulatory Branch
Corps No.: 199100099

Mr. James L. Jakubiak
Schnitzer Investment Corporation
International Terminal
PO Box 10047
Portland, Oregon 97296-0047

Dear Mr. Jakubiak:

Enclosed are your fully executed Department of the Army Permit and a notice of authorization that must be posted at the work site.

Please carefully read the permit and its conditions. In addition, if you have a contractor and/or agent, please review these conditions with them to ensure that the work is performed in accordance with the permit terms. Also be aware that other authorizations from Federal, state, or local governments may be required by law. If the work is not completed prior to the permit expiration date, you may apply for a time extension. We recommend you apply for a time extension at least 90 days before the expiration date of the permit.

If you have any questions regarding this nationwide permit verification, please contact Ms. Mary J. Headley at the letterhead address or telephone (503) 808-4392.

Sincerely,

Lawrence C. Evans
Chief, Regulatory Branch

Enclosures

Copy Furnished:

Parsons Brinckerhoff Quade & Douglas, Inc. (Jerald Ramsden) with Enclosures
Oregon Division of State Lands (DSL NO: RF-30895)
Oregon Department of Environmental Quality (Melville)
OP-GP (Nelson) w/ enclosure 1

DEPARTMENT OF THE ARMY PERMIT

Permittee: Schnitzer Steel Industries, Inc.

Permit No: 199100099

Issuing Office: U.S. Army Corps of Engineers, Portland District

NOTE: The term "you" and its derivatives, as used in this permit, means the permittee or any future transferee. The term "this office" refers to the appropriate district or division office of the Corps of Engineers having jurisdiction over the permitted activity or the appropriate official of that office acting under the authority of the commanding officer.

You are authorized to perform work in accordance with the terms and conditions specified below.

Project Description: Schnitzer Steel Industries, Inc. (SSI) proposes to conduct maintenance dredging of Berths 1, 2, and 3 at the International Terminals slip. The project involves dredging the area to a maximum depth of -42 feet Columbia River Datum (CRD), -38 feet CRD, or -24 feet CRD depending on location within the slip. The proposed dredge footprint covers about 9.6 acres with a maximum length of 2,250 feet and maximum width of 270 feet. The proposed dredge footprint lies entirely within the previously permitted dredge area and covers less area than authorized in previous permits. The initial dredge volume associated with the proposed dredge prism is 77,000 cubic yards (cy). Over the remainder of the permit duration, SSI proposes to dredge another 50,000 cy as needed for ongoing maintenance (e.g. 25,000 cy every other year, on average, in years two through five). Dredging will be by clamshell bucket, with transport to approved upland facilities or locations by barge, truck or rail.

Purpose: To maintain safe navigation access and berthing for the dock facilities at the SSI International Terminals slip by conducting periodic maintenance dredging, as needed. The slip and associated berths have been maintained under previous maintenance dredging permits (Department of the Army Permit 199100099 and Oregon Division of State Lands Removal-Fill Permit No. 1055). Shoaling at the mouth of the slip and within the berths has created a critical and urgent need to maintain these facilities.

Project Location: Willamette River, River Mile 3.5, Section 35, Township 2 North, Range 1 West, Portland, Multnomah County, Oregon

Drawing: Three (3) Sheets identified as COE No. 199100099 (Enclosure 1)

General Conditions:

1. The time limit for completing the work authorized ends on **January 31, 2009**. If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least one month before the above date is reached.

2. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted

activity, although you may make a good faith transfer to a third party in compliance with General Condition 4 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area.

3. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the

Federal and state coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

4. If you sell the property associated with this permit, you must obtain the signature of the new owner in the space provided and forward a copy of the permit to this office to validate the transfer of this authorization.

5. A conditioned water quality certification has been issued for your project. You must comply with the conditions specified in the certification as special conditions to this Department of the Army permit. For your convenience, a copy of the certification is attached (Enclosure 2).

6. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of your permit.

Special Conditions:

1. **In-water Work Windows:** All in-water work, including temporary fills or structures, shall occur between July 1-October 31 and December 1-January 31 (timeframes are specific to the Willamette River, from the mouth to Willamette Falls). Exceptions to these time periods require specific approval from the Corps.

2. The following special condition is a part of all Department of the Army permits that provide authorization under Section 10 of the Rivers and Harbors Act, regardless whether the permit provides such authorization under Section 10 alone, or in combination with authorization under other laws:

• The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the U.S Army Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

3. The Environmental Protection Agency (EPA) is presently evaluating the Willamette River between the mouth of the river and Willamette Falls (river miles 0-26). This is the reach of the river that EPA has identified as an "area of interest" pursuant to a National Priorities Listing under the Comprehensive Environmental Response, Compensation, and Liability Act, the Resource Conservation and Recovery Act, and the Federal Water Pollution Control Act. The following statement is provided at the request of EPA:

• "This permit does not exclude the permittee from liability or any requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 as amended (42 U.S.C 9601 et. Seq.), the Resource Conservation and Recover Act of 1978 as amended (42 USC 6901 et. Seq.), the Federal Water Pollution Control Act as amended (33 USC 1251 et. Seq.) and any and all requirements of the State of Oregon under Revised Statures or Administrative Rules. The Protection Agency and the Oregon Department of Environmental Quality pursuant to a National priorities Listing relative to the Willamette River. Granting of this permit by the Portland District, US Army Corps of Engineers should in no way be construed as approval of this project as being in compliance with the above cited authorities. Neither should the permittee consider this permit as absolving the permittee from any liability or damages from any party whomsoever."

4. The permittee (Schnitzer Steel Industries, Inc) will comply with the terms and conditions of the US Fish and Wildlife Service letter of concurrence (Enclosure 3). Your authorization under this Department of the Army permit is conditional upon your compliance with these mandatory terms and conditions in order to minimize adverse affects on listed Bald Eagle under the Federal Endangered Species Act. Specifically:

a. A close-lipped clamshell bucket will be used to dredge the project sites with all dredged material transported to approved upland facilities or location by barge, truck, or rail. Any incidences when the close-lipped bucket is not used will be described in a post-dredging report, with copies provided to the Corps and FWS. Include when, where, and the length of time the close-lipped dredge was out of service.

b. A turbidity management plan will be developed using guidelines established by the Oregon Department of Environmental Quality (ODEQ).

c. Dredging depths, including overdrafts, will be kept to a minimum.

5. Endangered Species Act and Magnuson Stevens Act Requirements. This Corps permit does not authorize you to take a listed species. In order to legally take a listed species, you must have separate authorization under the Endangered Species Act (ESA) (e.g., an ESA Section 10 permit, or a Biological Opinion under ESA Section 7, with "incidental take" provisions with which you must comply). "Incidental take" is take of listed species that results from, but is not the purpose of, the Federal agency or the Permittee carrying out an otherwise lawful activity. Take (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct) of an endangered or threatened species is prohibited without a specific permit or exemption.

The Biological Opinion which the Corps used to evaluate your proposal for compliance with the ESA and the Magnuson-Stevens Act, is a programmatic procedure developed with National Marine Fisheries Service (NOAA Fisheries) for specific activities requiring a Corps permit entitled *Standard Local Operating Procedures for Endangered Species (Slopes) for Certain Regulatory and Operations Activities Carried Out by the Department of the Army Permits in Oregon and the North Shore of the Columbia River*, dated July 8, 2003. The Corps recommends that you review the SLOPES opinion in its entirety, which you may obtain on-line at https://www.nwp.usace.army.mil/op/g/notices/Slopes.pdf.

The enclosed SLOPES document (in part) (Enclosure 4) contains mandatory terms and conditions to implement the reasonable and prudent measures (RPM) that are associated with incidental take specified in SLOPES.

Your authorization under this Corps permit is conditional upon your compliance with all of the mandatory terms and conditions associated with incidental take of the attached SLOPES conditions, which are incorporated by reference in this permit. Failure to comply with the terms and conditions associated with incidental take of SLOPES, where a take of the listed species occurs, constitutes an unauthorized take, and constitutes non-compliance with your Corps permit. The NOAA Fisheries is the appropriate authority to determine compliance with the terms and conditions of SLOPES, ESA, and MSA.

The Corps hereby requires the Permittee to adhere to the following Special Conditions in order to minimize adverse affects on ESA listed Chinook salmon, and Steelhead trout, and MSA listed Chinook and Coho salmon, and Starry flounder:

a. To satisfy the requirements of SLOPES RPM #1, the Corps requires that the Permittee comply with the following:

1. Project Access. The Permittee shall ensure that landowner(s) provide reasonable access to the project area for monitoring the use and effectiveness of permit conditions. Reasonable access means, with prior notice to the Permittee, the Corps and NOAA Fisheries may at reasonable times and in a safe manner, enter and inspect the permitted project to ensure compliance with the reasonable and prudent measures and terms and conditions in this Opinion.

2. Salvage Notice. If a sick, injured or dead specimen of a threatened or endangered species is found, the finder must notify the Vancouver Field Office of NOAA Fisheries Law Enforcement at 360-418-4246. The finder must take care in the handling of sick or injured specimens to ensure effective treatment, and in handling dead

specimens to preserve biological material in the best possible condition for later analysis of cause of death. The finder also has the responsibility to carry out instructions provided by Law Enforcement to ensure that evidence intrinsic to the specimen is not disturbed unnecessarily.

b. General Conditions. To satisfy the requirements of general conditions for surveying, exploration, construction, operation, and maintenance under SLOPES, the Permittee shall fully implement all conditions, as applicable to the permitted activity, in RPM #2 (Enclosure 4a). Please note that the general terms and conditions of Measure 2 cover an array of diverse activities such that not all requirements may apply to your particular project.

c. Activity-Specific Conditions. To satisfy the requirements of maintenance dredging under SLOPES, the Permittee shall fully implement all conditions, as applicable to the permitted activity in RPMs 11 & 12 Enclosure 4b).

d. Monitoring. To satisfy the monitoring requirements of SLOPES the Permittee shall fully implement RPM #13,(a) Regulatory program implementation monitoring (Enclosure 4c). Please note that RPM #13(a) requires the submittal of an implementation report, photo documentation, and additional project-specific data within 120 days of "project completion". Project completion, for the purposes of this report,

is defined as the date when work in waters of the U.S. is complete, which may differ from the date when the entire project is complete. In addition to the implementation report, Measure 13(a)(iv) requires an annual report submitted to the Corps by December 31st of each monitoring year for projects requiring restoration or mitigation. The monitoring period begins with the first growing season after project completion.

e. The Permittee shall provide all documentation and reports as required for submittal by this Opinion to the following address:

U.S. Army Corps of Engineers
Regulatory Branch
Compliance & Enforcement Section (Multnomah – 199100099)
P.O. Box 2946
Portland, Oregon 97208

6. The permittee will evaluate sediment quality before each dredging occurrence, and comply with requirements of the *Dredge Maintenance Evaluation Framework for the Lower Columbia River Management Area* (DMEF) (November 1998). Sediment quality reports will be submitted to the Corps for coordination, and determination of compliance with DMEF, with the Regional Management Team (RMT). At times this process can be lengthy, so please allow sufficient time for the Corps to complete coordination with the RMT (6 months recommended). Provide 4 complete copies of the report to the following address:

U.S. Army Corps of Engineers
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Permit Section (Multnomah – 199100099)
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7. The permittee will dispose of dredge spoils at an approved upland facility. Any temporary dredge spoil area (e.g. on a barge) will be fully-contained so as to limit return flows to the river to less than 4-feet per second.

Further Information:

1. Congressional Authorities: You have been authorized to undertake the activity described above pursuant to:

(X) Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403).
(X) Section 404 of the Clean Water Act (33 U.S.C. 1344).

2. Limits of this authorization.

a. This permit does not obviate the need to obtain other Federal, state, or local authorizations required by law.

b. This permit does not grant any property rights or exclusive privileges.

c. This permit does not authorize any injury to the property or rights of others.

d. This permit does not authorize interference with any existing or proposed Federal project.

3. Limits of Federal Liability. In issuing this permit, the Federal Government does not assume any liability for the following:

a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.

b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest.

c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.

d. Design or construction deficiencies associated with the permitted work.

e. Damage claims associated with any future modification, suspension, or revocation of this permit.

4. Reliance on Applicant's Data: The determination of this office that issuance of this permit is not contrary to the public interest was made in reliance on the information you provided.

5. Reevaluation of Permit Decision. This office may reevaluate its decision on this permit at any time the circumstances warrant. Circumstances that could require a reevaluation include, but are not limited to, the following:

a. You fail to comply with the terms and conditions of this permit.

b. The information provided by you in support of your permit application proves to have been false, incomplete, or inaccurate (See 4 above).

c. Significant new information surfaces which this office did not consider in reaching the original public interest decision.

Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 CFR 325.7 or enforcement procedures such as those contained in 33 CFR 326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative order requiring you to comply with the terms and conditions of your permit and for the initiation of legal action where appropriate. You will be required to pay for any corrective measures ordered by this office, and if you fail to comply with such directive, this office may in certain situations (such as those specified in 33 CFR 209.170) accomplish the corrective measures by contract or otherwise and bill you for the cost.

6. Extensions. General condition 1 establishes a time limit for the completion of the activity authorized by this permit. Unless there are circumstances requiring either a prompt completion of the authorized activity or a reevaluation of the public interest decision, the Corps will normally give favorable consideration to a request for an extension of this time limit.

Your signature below, as permittee, indicates that you accept and agree to comply with the terms and conditions of this permit.

Thomas F Zelenka 4/20/04

(PERMITTEE SIGNATURE) (DATE)

Thomas F. Zelenka Vice President

(PRINTED NAME) (TITLE)

This permit becomes effective when the Federal official, designated to act for the Secretary of the Army, has signed below.

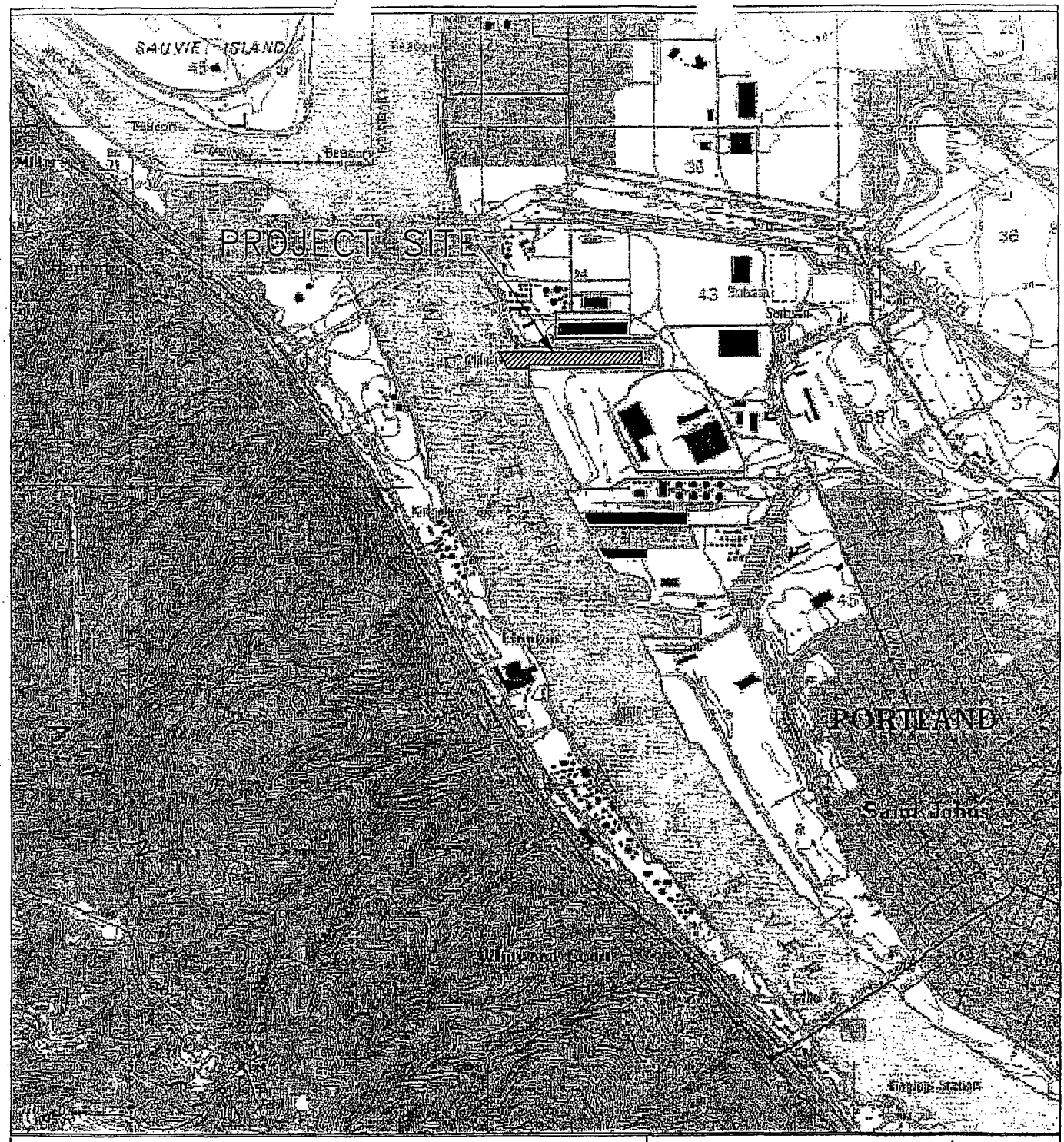
Donald Borcela APRIL 21, 2004

(DISTRICT ENGINEER) (DATE)
FOR
Richard W. Hobernicht
Colonel, Corps of Engineers
District Engineer

When the structures or work authorized by this permit are still in existence at the time the property is transferred, the terms and conditions of this permit will continue to be binding on the new owner(s) of the property. To validate the transfer of this permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.

(TRANSFEREE) (DATE)

(PRINTED NAME) (TITLE)



NOTE 1. LOCATION MAP OBTAINED FROM US GEOLOGICAL SURVEY QUAD SHEET FOR LINNTON, OR

PURPOSE: MAINTAIN NAVIGATION ACCESS AND BERTHS FOR SHIPS AND BARGES
VERTICAL DATUM: COLUMBIA RIVER DATUM (CRD), CRD IS 1.6' ABOVE NGVD AT WILLAMETTE RIVER MILE 3.6
ADJACENT PROPERTY OWNERS:
1. NORTHWEST TERMINAL COMPANY
2. PORT OF PORTLAND

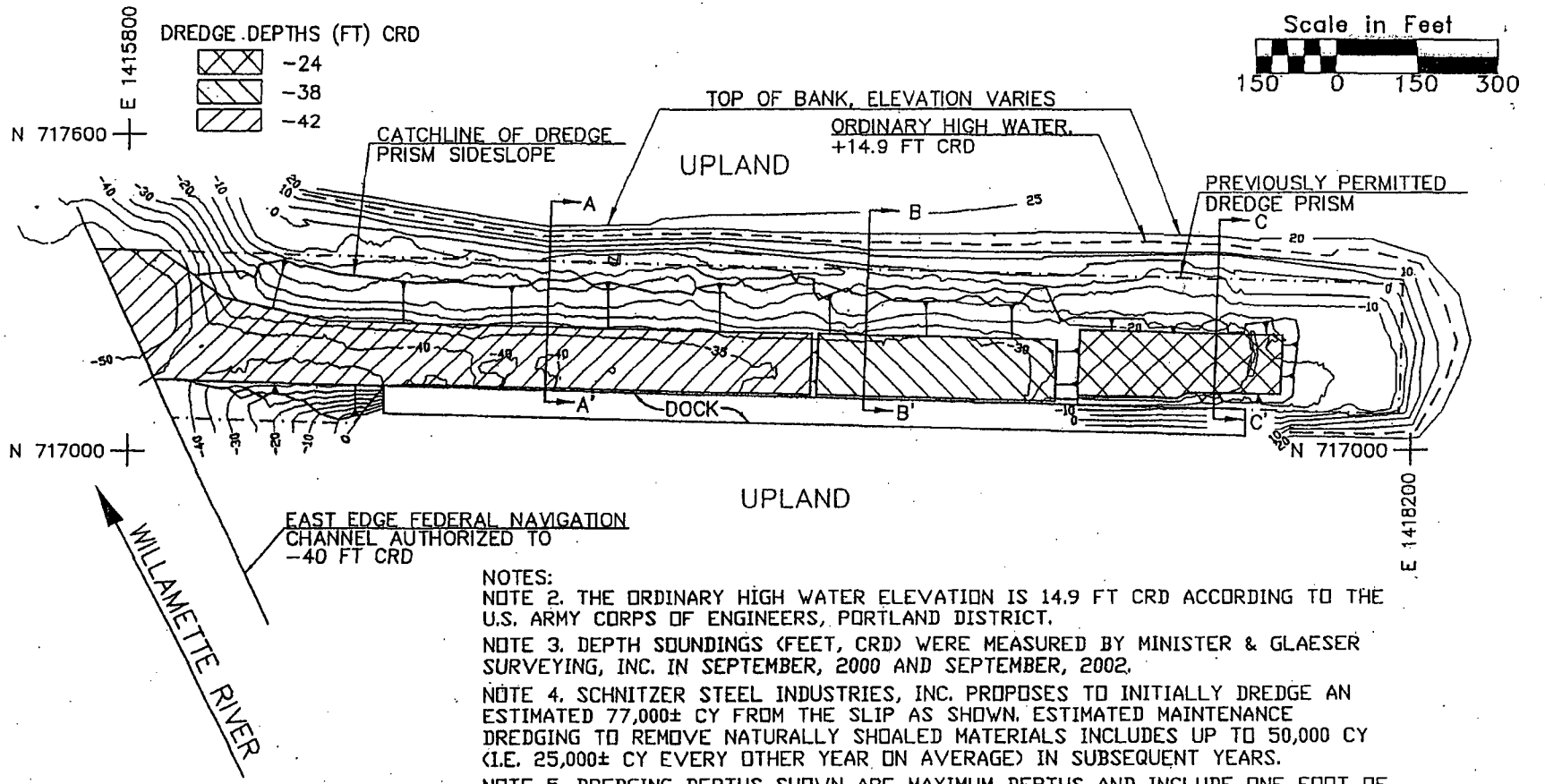
LATITUDE: 45° 36' 41" N
LONGITUDE: 122° 46' 42" W

COE NO. 199100099

ENCLOSURE 1

PROPOSED MAINTENANCE DREDGING AT INTERNATIONAL TERMINALS

IN: WILLAMETTE RIVER
AT: RIVER MILE 3.6
COUNTY OF: MULTNOMAH
APPLICATION BY: SCHNITZER STEEL INDUSTRIES, INC.
SHEET 1 OF 3 DATE: 5/29/03



NOTES:

NOTE 2. THE ORDINARY HIGH WATER ELEVATION IS 14.9 FT CRD ACCORDING TO THE U.S. ARMY CORPS OF ENGINEERS, PORTLAND DISTRICT.

NOTE 3. DEPTH SOUNDINGS (FEET, CRD) WERE MEASURED BY MINISTER & GLAESER SURVEYING, INC. IN SEPTEMBER, 2000 AND SEPTEMBER, 2002.

NOTE 4. SCHNITZER STEEL INDUSTRIES, INC. PROPOSES TO INITIALLY DREDGE AN ESTIMATED 77,000± CY FROM THE SLIP AS SHOWN. ESTIMATED MAINTENANCE DREDGING TO REMOVE NATURALLY SHOALED MATERIALS INCLUDES UP TO 50,000 CY (I.E. 25,000± CY EVERY OTHER YEAR ON AVERAGE) IN SUBSEQUENT YEARS.

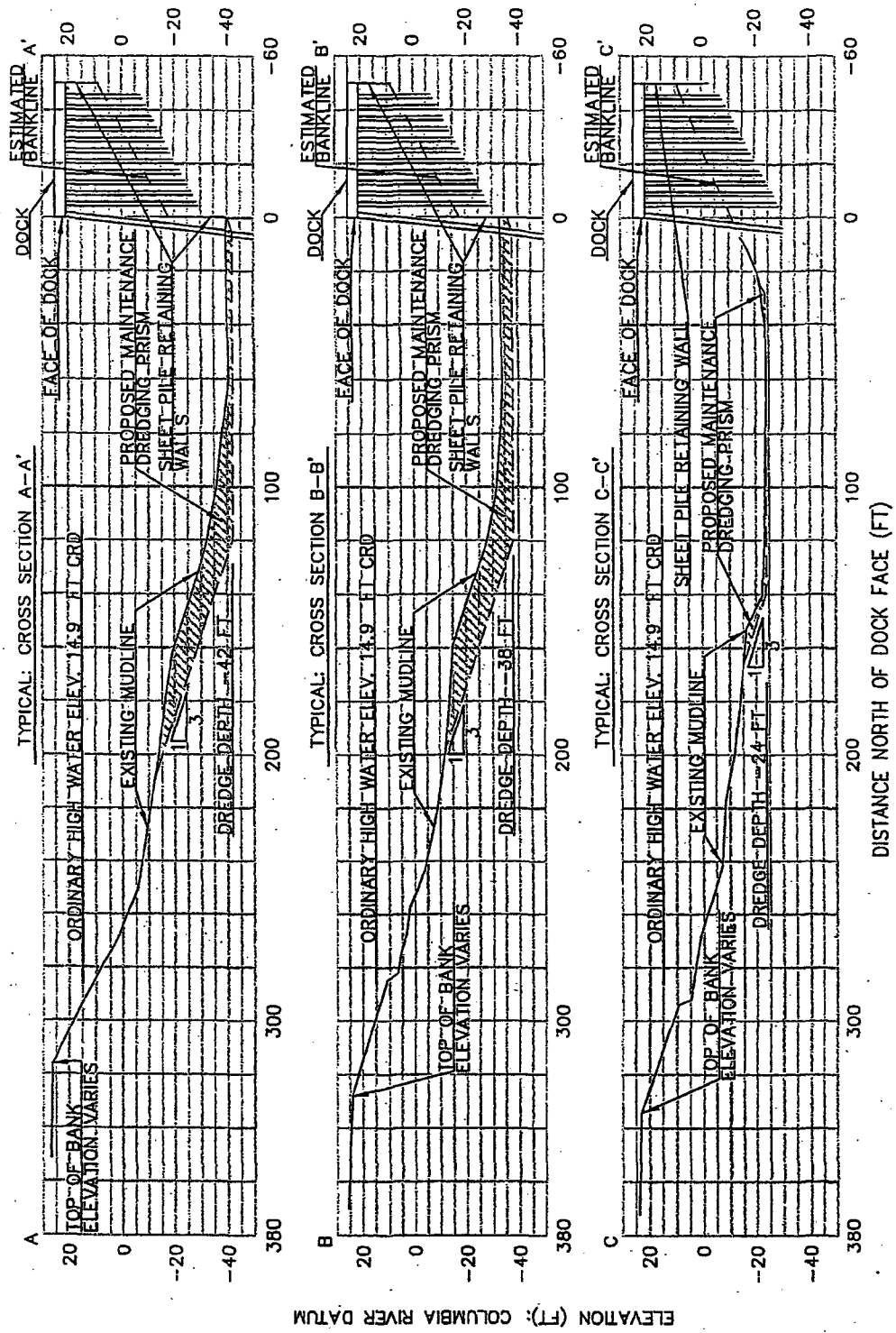
NOTE 5. DREDGING DEPTHS SHOWN ARE MAXIMUM DEPTHS AND INCLUDE ONE FOOT OF ADVANCED MAINTENANCE AND ONE FOOT OF ALLOWABLE OVERDEPTH DUE TO DREDGING INACCURACY.

NOTE 6. SCHNITZER STEEL INDUSTRIES, INC. PROPOSES TO DREDGE THE MATERIAL USING A CLAMSHELL BUCKET OPERATED FROM A FLOATING CRANE. DREDGED MATERIAL WILL BE PLACED IN APPROVED UPLAND LOCATIONS.

COE NO. 199100099

	PURPOSE: MAINTAIN NAVIGATION ACCESS AND BERTHS FOR SHIPS AND BARGES VERTICAL DATUM: COLUMBIA RIVER DATUM (CRD), CRD IS 1.6' ABOVE NGVD AT WILLAMETTE RIVER MILE 3.6 ADJACENT PROPERTY OWNERS: 1. NORTHWEST TERMINAL COMPANY 2. PORT OF PORTLAND	LATITUDE: 45° 36' 41" N LONGITUDE: 122° 46' 42" W HORIZONTAL DATUM: OREGON STATE PLANE COORDINATE SYSTEM, NORTH ZONE (NAD-27), U.S. SURVEY FEET	PROPOSED MAINTENANCE DREDGING AT INTERNATIONAL TERMINALS IN: WILLAMETTE RIVER AT: RIVER MILE 3.6 COUNTY OF: MULTNOMAH APPLICATION BY: SCHNITZER STEEL INDUSTRIES, INC. SHEET 2 OF 3 DATE: 5/29/03

SCHN00157930



PURPOSE: MAINTAIN NAVIGATION ACCESS AND BERTHS FOR SHIPS AND BARGES

VERTICAL DATUM: COLUMBIA RIVER DATUM (CRD), CRD IS 1.6' ABOVE NGVD AT WILLAMETTE RIVER MILE 3.6

ADJACENT PROPERTY OWNERS:
1. NORTHWEST TERMINAL COMPANY
2. PORT OF PORTLAND

LATITUDE: 45° 36' 41" N
LONGITUDE: 122° 46' 42" W

SCALE: AS SHOWN

COE NO. 199100099

PROPOSED MAINTENANCE DREDGING AT INTERNATIONAL TERMINALS

IN: WILLAMETTE RIVER
AT: RIVER MILE 3.6
COUNTY OF: MULTNOMAH
APPLICATION BY: SCHNITZER STEEL INDUSTRIES, INC.
SHEET 3 OF 3 DATE: 5/29/03

SCHN00157931

DEPARTMENT OF THE ARMY
PORTLAND DISTRICT, CORPS OF ENGINEERS
POST OFFICE BOX 2946
PORTLAND, OREGON 97208-2946

REPLY TO
ATTENTION OF:

APR 21 2004

Operations Division
Regulatory Branch
Corps No.: 199200812

Mr. James L. Jakubiak
Schnitzer Investment Corporation
International Terminal
PO Box 10047
Portland, Oregon 97296-0047

Dear Mr. Jakubiak:

Enclosed are your fully executed Department of the Army Permit and a notice of authorization that must be posted at the work site.

Please carefully read the permit and its conditions. In addition, if you have a contractor and/or agent, please review these conditions with them to ensure that the work is performed in accordance with the permit terms. Also be aware that other authorizations from Federal, state, or local governments may be required by law. If the work is not completed prior to the permit expiration date, you may apply for a time extension. We recommend you apply for a time extension at least 90 days before the expiration date of the permit.

If you have any questions regarding this nationwide permit verification, please contact Ms. Mary J. Headley at the letterhead address or telephone (503) 808-4392.

Sincerely,

Lawrence C. Evans
Chief, Regulatory Branch

Enclosures

Copy Furnished:

Parsons Brinckerhoff Quade & Douglas, Inc. (Jerald Ramsden)
Oregon Division of State Lands (DSL NO: RF-30895)
Oregon Department of Environmental Quality (Melville)
OP-GP (Nelson) w/ enclosure 1

DEPARTMENT OF THE ARMY PERMIT

Permittee: Schnitzer Steel Industries, Inc.

Permit No: 199200812

Issuing Office: U.S. Army Corps of Engineers, Portland District

NOTE: The term "you" and its derivatives, as used in this permit, means the permittee or any future transferee. The term "this office" refers to the appropriate district or division office of the Corps of Engineers having jurisdiction over the permitted activity or the appropriate official of that office acting under the authority of the commanding officer.

You are authorized to perform work in accordance with the terms and conditions specified below.

Project Description: Schnitzer Steel Industries, Inc. (SSI) proposes to conduct maintenance dredging of Berths 4 and 5 at the International Terminals slip. The project involves dredging the area to a maximum depth of -42 feet Columbia River Datum (CRD) in Berth 4, and -36 feet CRD in Berth 5, as shown on the attached drawings. The proposed dredge footprint covers about 6.6 acres with a maximum length of 1,600 feet and maximum width of 220 feet. The proposed dredge footprint lies entirely within the previously permitted dredge area and covers less area than authorized in previous permits. The initial dredge volume associated with the proposed dredge prism is 61,000 cubic yards (cy). Over the remainder of the permit duration, SSI proposes to dredge another 40,000 cy as needed for ongoing maintenance (e.g. 20,000 cy every other year, on average, in years two through five). Dredging will be by clamshell bucket, with transport to approved upland facilities or locations by barge, truck or rail.

Purpose: To maintain safe navigation access and berthing for the existing facilities associated with Berths 4 and 5 at the International Terminals by conducting maintenance dredging, as needed. The two berths have been maintained under previous maintenance dredging permits (Department of the Army Permit 199200812 and the Oregon Division of State Lands Permit No. 3701). Berth 4 is currently used to export bulk metal products with a conveyor system. Berth 5 has a floating dock with a crane and is used for temporary moorage. The site is primarily used to support metal recycling and vessel dismantling operations. Due to shoaling within each of the berths, there is a critical and urgent need to maintain water depth at these facilities to prevent disruption of routine operations.

Project Location: Willamette River, River Mile 4.1, Section 35, Township 2 North, Range 1 West, Portland, Multnomah County, Oregon

Drawings: Three (3) Sheets identified as *COE No. 199200812* (Enclosure 1)

General Conditions:

1. The time limit for completing the work authorized ends on **January 31, 2009**. If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least one month before the above date is reached.

2. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Condition 4 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area.

3. If you discover any previously unknown historic or archeological remains while accomplishing the activity

authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and state coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

4. If you sell the property associated with this permit, you must obtain the signature of the new owner in the space provided and forward a copy of the permit to this office to validate the transfer of this authorization.

5. A conditioned water quality certification has been issued for your project. You must comply with the conditions specified in the certification as special conditions to this Department of the Army permit. For your convenience, a copy of the certification is attached (Enclosure 2).

6. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of your permit.

Special Conditions:

1. **In-water Work Windows:** All in-water work, including temporary fills or structures, shall occur between July 1-October 31 and December 1-January 31 (timeframes are specific to the Willamette River, from the mouth to Willamette Falls). Exceptions to these time periods require specific approval from the Corps.

2. The following special condition is a part of all Department of the Army permits that provide authorization under Section 10 of the Rivers and Harbors Act, regardless whether the permit provides such authorization under Section 10 alone, or in combination with authorization under other laws:

- The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the U.S Army Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

3. The Environmental Protection Agency (EPA) is presently evaluating the Willamette River between the mouth of the river and Willamette Falls (river miles 0-26). This is the reach of the river that EPA has identified as an "area of interest" pursuant to a National Priorities Listing under the

Comprehensive Environmental Response, Compensation, and Liability Act, the Resource Conservation and Recovery Act, and the Federal Water Pollution Control Act. The following statement is provided at the request of EPA:

- "This permit does not exclude the permittee from liability or any requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 as amended (42 U.S.C 9601 et. Seq.), the Resource Conservation and Recover Act of 1978 as amended (42 USC 6901 et. Seq.), the Federal Water Pollution Control Act as amended (33 USC 1251 et. Seq.) and any and all requirements of the State of Oregon under Revised Statures or Administrative Rules. The Protection Agency and the Oregon Department of Environmental Quality pursuant to a National priorities Listing relative to the Willamette River. Granting of this permit by the Portland District, US Army Corps of Engineers should in no way be construed as approval of this project as being in compliance with the above cited authorities. Neither should the permittee consider this permit as absolving the permittee from any liability or damages from any party whomsoever."

4. The permittee (Schnitzer Steel Industries, Inc) will comply with the terms and conditions of the US Fish

and Wildlife Service letter of concurrence (Enclosure 3). Your authorization under this Department of the Army permit is conditional upon your compliance with these mandatory terms and conditions in order to minimize adverse affects on listed Bald Eagle under the Federal Endangered Species Act. Specifically:

a. A close-lipped clamshell bucket will be used to dredge the project sites with all dredged material transported to approved upland facilities or location by barge, truck, or rail. Any incidences when the close-lipped bucket is not used will be described in a post-dredging report, with copies provided to the Corps and FWS. Include when, where, and the length of time the close-lipped dredge was out of service.

b. A turbidity management plan will be developed using guidelines established by the Oregon Department of Environmental Quality (ODEQ).

c. Dredging depths, including overdrafts, will be kept to a minimum.

5. Endangered Species Act and Magnuson Stevens Act Requirements. This Corps permit does not authorize you to take a listed species. In order to legally take a listed species, you must have separate authorization under the Endangered Species Act (ESA) (e.g., an ESA Section 10 permit, or a Biological Opinion under ESA Section 7, with "incidental take" provisions with which you must comply). "Incidental take" is take of listed species that results from, but is not the purpose of, the Federal agency or the Permittee carrying out an otherwise lawful activity. Take (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct) of an endangered or threatened species is prohibited without a specific permit or exemption.

The Biological Opinion which the Corps used to evaluate your proposal for compliance with the ESA and the Magnuson-Stevens Act, is a programmatic procedure developed with National Marine Fisheries Service (NOAA Fisheries) for specific activities requiring a Corps permit entitled *Standard Local Operating Procedures for Endangered Species (Slopes) for Certain Regulatory and Operations Activities Carried Out by the Department of the Army Permits in Oregon and the North Shore of the Columbia River*, dated July 8, 2003. The Corps recommends that you review the SLOPES opinion in its entirety, which you may obtain on-line at https://www.nwp.usace.army.mil/op/g/notices/Slopes.pdf.

The enclosed SLOPES document (in part) (Enclosure 4) contains mandatory terms and conditions to implement the reasonable and prudent measures (RPM) that are associated with incidental take specified in SLOPES.

Your authorization under this Corps permit is conditional upon your compliance with all of the mandatory terms and conditions associated with incidental take of the attached SLOPES conditions, which are incorporated by reference in this permit. Failure to comply with the terms and conditions associated with incidental take of SLOPES, where a take of the listed species occurs, constitutes an unauthorized take, and constitutes non-compliance with your Corps permit. The NOAA Fisheries is the appropriate authority to determine compliance with the terms and conditions of SLOPES, ESA, and MSA.

The Corps hereby requires the Permittee to adhere to the following Special Conditions in order to minimize adverse affects on ESA listed Chinook salmon, and Steelhead trout, and MSA listed Chinook and Coho salmon, and Starry flounder:

a. To satisfy the requirements of SLOPES RPM #1, the Corps requires that the Permittee comply with the following:

1. Project Access. The Permittee shall ensure that landowner(s) provide reasonable access to the project area for monitoring the use and effectiveness of permit conditions. Reasonable access means, with prior notice to the Permittee, the Corps and NOAA Fisheries may at reasonable times and in a safe manner, enter and inspect the permitted project to ensure compliance with the reasonable and prudent measures and terms and conditions in this Opinion.

2. Salvage Notice. If a sick, injured or dead specimen of a threatened or endangered species is found, the finder must notify the Vancouver Field Office of NOAA Fisheries Law Enforcement at 360-418-4246. The finder must take care in the handling of sick or injured specimens to ensure effective treatment, and in handling dead specimens to preserve biological material in the best possible condition for later analysis of cause of death. The finder also has the responsibility to carry out instructions provided by Law Enforcement to ensure that evidence intrinsic to the specimen is not disturbed unnecessarily.

b. General Conditions. To satisfy the requirements of general conditions for surveying, exploration, construction, operation, and maintenance under SLOPES, the Permittee shall fully implement all conditions, as applicable to the permitted activity, in RPM #2 (Enclosure 4a). Please note that the general terms and conditions of Measure 2 cover an array of diverse activities such that not all requirements may apply to your particular project.

c. Activity-Specific Conditions. To satisfy the requirements of maintenance dredging under SLOPES, the Permittee shall fully implement all conditions, as applicable to the permitted activity in RPMs 11 & 12 Enclosure 4b).

d. Monitoring. To satisfy the monitoring requirements of SLOPES the Permittee shall fully implement RPM #13,(a) Regulatory program implementation monitoring (Enclosure 4c). Please note that RPM #13(a) requires the submittal of an implementation report, photo documentation, and additional project-specific data within 120 days of "project completion". Project completion, for the purposes of this report, is defined as the date when work in waters of the U.S. is complete, which may differ from the date when the entire project is complete. In addition to the implementation report, Measure 13(a)(iv) requires an annual report submitted to the Corps by December 31st of each monitoring year for projects requiring restoration or mitigation. The monitoring period begins with the first growing season after project completion.

e. The Permittee shall provide all documentation and reports as required for submittal by this Opinion to the following address:

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Regulatory Branch
Compliance & Enforcement Section (Multnomah – 199200812)
P.O. Box 2946
Portland, Oregon 97208

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Permit Section (Multnomah – 199200812)
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7. The permittee will dispose of dredge spoils at an approved upland facility. Any temporary dredge spoil area (e.g. on a barge) will be fully-contained so as to limit return flows to the river to less than 4-feet per second.

Further Information:

1. Congressional Authorities: You have been authorized to undertake the activity described above pursuant to:

(X) Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403).
(X) Section 404 of the Clean Water Act (33 U.S.C. 1344).

2. Limits of this authorization.

a. This permit does not obviate the need to obtain other Federal, state, or local authorizations required by law.

b. This permit does not grant any property rights or exclusive privileges.

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e. Damage claims associated with any future modification, suspension, or revocation of this permit.

4. Reliance on Applicant's Data: The determination of this office that issuance of this permit is not contrary to the public interest was made in reliance on the information you provided.

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a. You fail to comply with the terms and conditions of this permit.

b. The information provided by you in support of your permit application proves to have been false, incomplete, or inaccurate (See 4 above).

c. Significant new information surfaces which this office did not consider in reaching the original public interest decision.

Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 CFR 325.7 or enforcement procedures such as those contained in 33 CFR

326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative order requiring you to comply with the terms and conditions of your permit and for the initiation of legal action where appropriate. You will be required to pay for any corrective measures ordered by this office, and if you fail to comply with such directive, this office may in certain situations (such as those specified in 33 CFR 209.170) accomplish the corrective measures by contract or otherwise and bill you for the cost.

6. Extensions. General condition 1 establishes a time limit for the completion of the activity authorized by this permit. Unless there are circumstances requiring either a prompt completion of the authorized activity or a reevaluation of the public interest decision, the Corps will normally give favorable consideration to a request for an extension of this time limit.

Your signature below, as permittee, indicates that you accept and agree to comply with the terms and conditions of this permit.

Thomas F Zelenka 4/20/04

(PERMITTEE SIGNATURE) (DATE)

Thomas F. Zelenka Vice President

(PRINTED NAME) (TITLE)

This permit becomes effective when the Federal official, designated to act for the Secretary of the Army, has signed below.

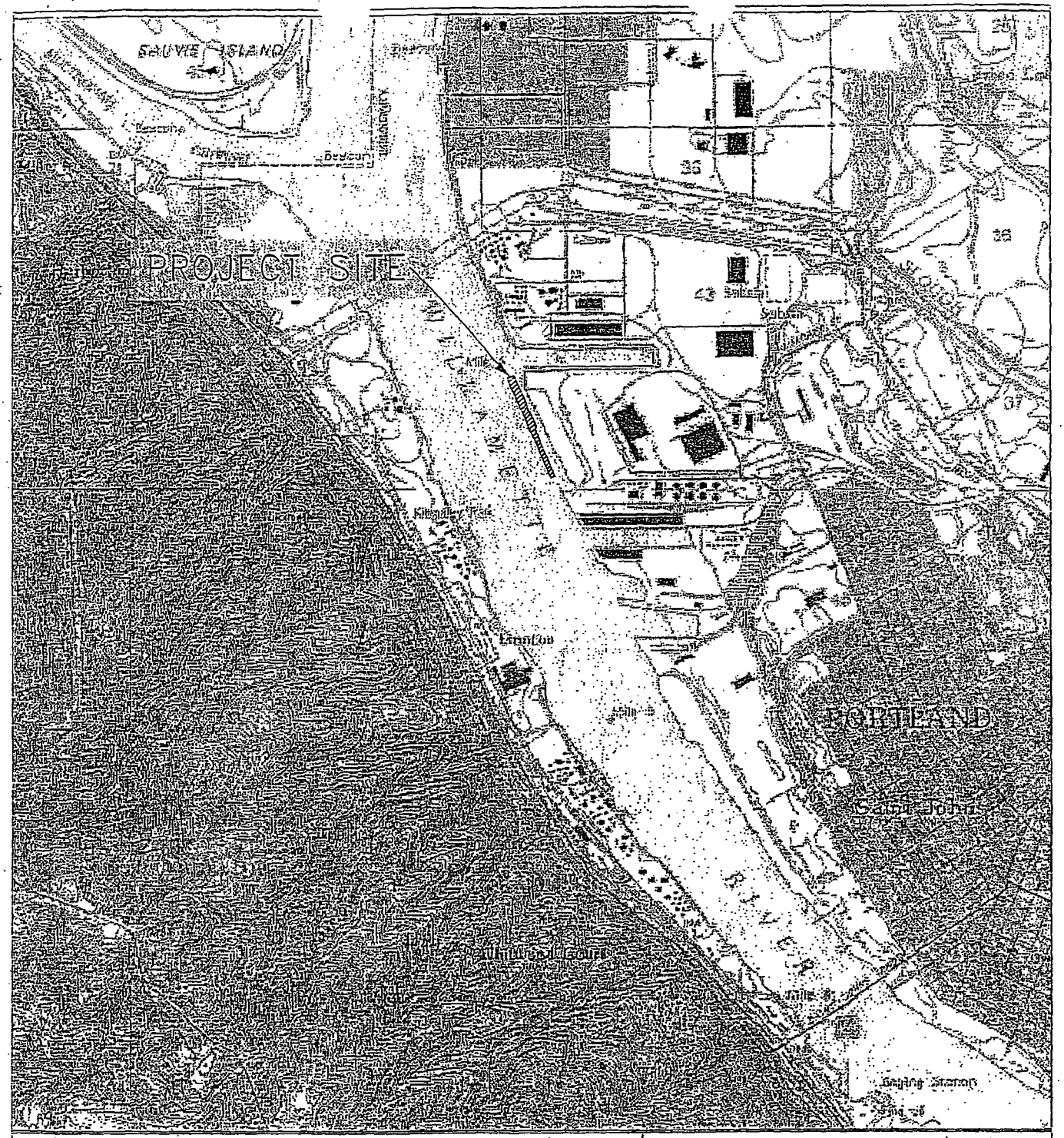
Donald Borden APRIL 21, 2004

(DISTRICT ENGINEER) (DATE)
FOR
Charles S. Markham
Lieutenant Colonel, Corps of Engineers
Acting Commander

When the structures or work authorized by this permit are still in existence at the time the property is transferred, the terms and conditions of this permit will continue to be binding on the new owner(s) of the property. To validate the transfer of this permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.

(TRANSFEREE) (DATE)

(PRINTED NAME) (TITLE)



NOTE 1. LOCATION MAP OBTAINED FROM US GEOLOGICAL SURVEY QUAD SHEET FOR LINNTON, OR

Scale in Feet
0 1000 2000

PURPOSE: MAINTAIN NAVIGATION ACCESS AND BERTHS FOR SHIPS AND BARGES
VERTICAL DATUM: COLUMBIA RIVER DATUM (CRD), CRD IS 1.6' ABOVE NGVD AT WILLAMETTE RIVER MILE 3.8
ADJACENT PROPERTY OWNERS:
1. NORTHWEST TERMINAL COMPANY
2. PORT OF PORTLAND

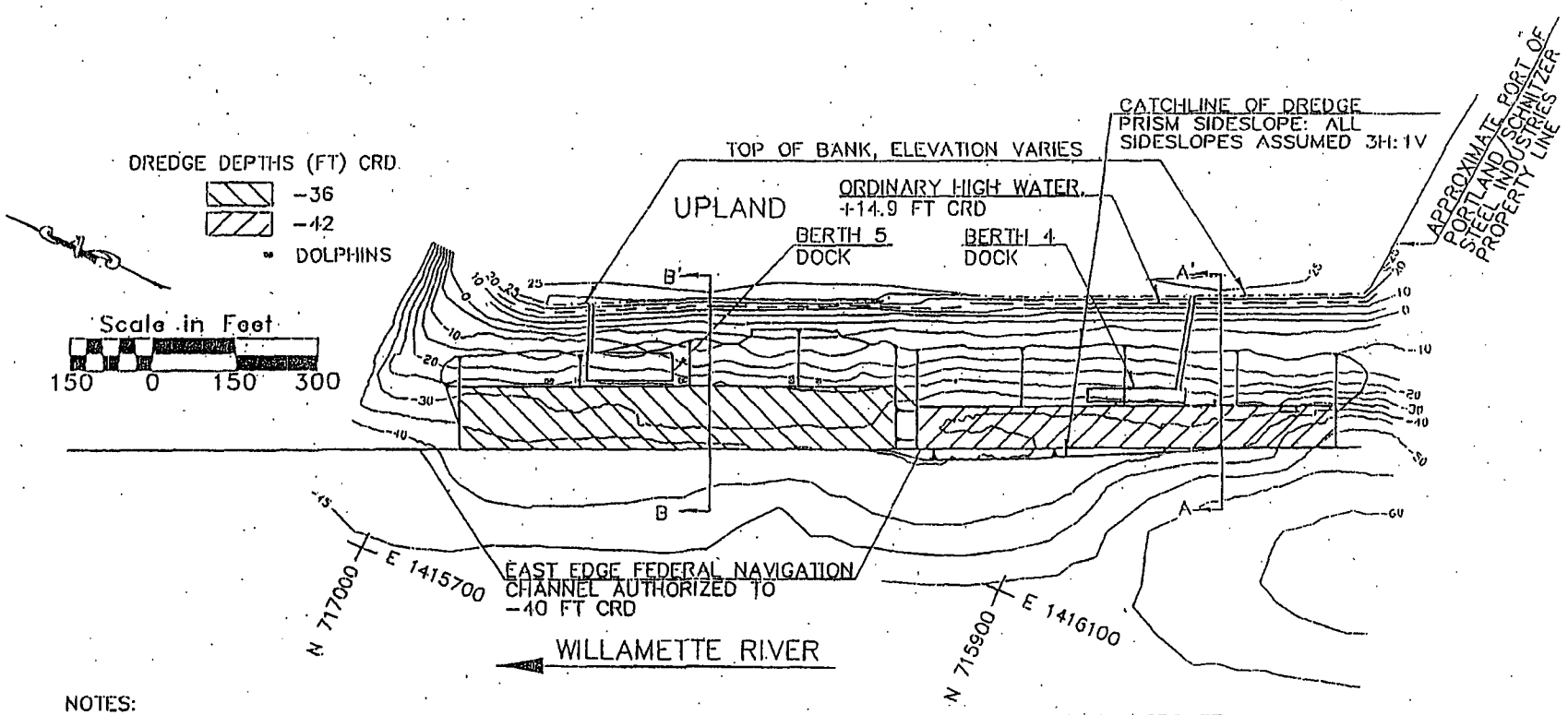
LATITUDE: 45° 36' 30" N
LONGITUDE: 122° 46' 52" W

ENCLOSURE 1

PROPOSED MAINTENANCE DREDGING AT INTERNATIONAL TERMINALS

IN: WILLAMETTE RIVER
AT: RIVER MILE 4.2
COUNTY OF: MULTNOMAH
APPLICATION BY: SCHNITZER STEEL INDUSTRIES, INC.
SHEET 1 OF 3 DATE: 6/03/03

SCHN00157939



NOTES:

NOTE 2. THE ORDINARY HIGH WATER ELEVATION IS 14.9 FT CRD ACCORDING TO THE U.S. ARMY CORPS OF ENGINEERS, PORTLAND DISTRICT.

NOTE 3. DEPTH SOUNDINGS (FEET, CRD) WERE MEASURED BY MINISTER & GLAESER SURVEYING, INC. IN SEPTEMBER, 2002.

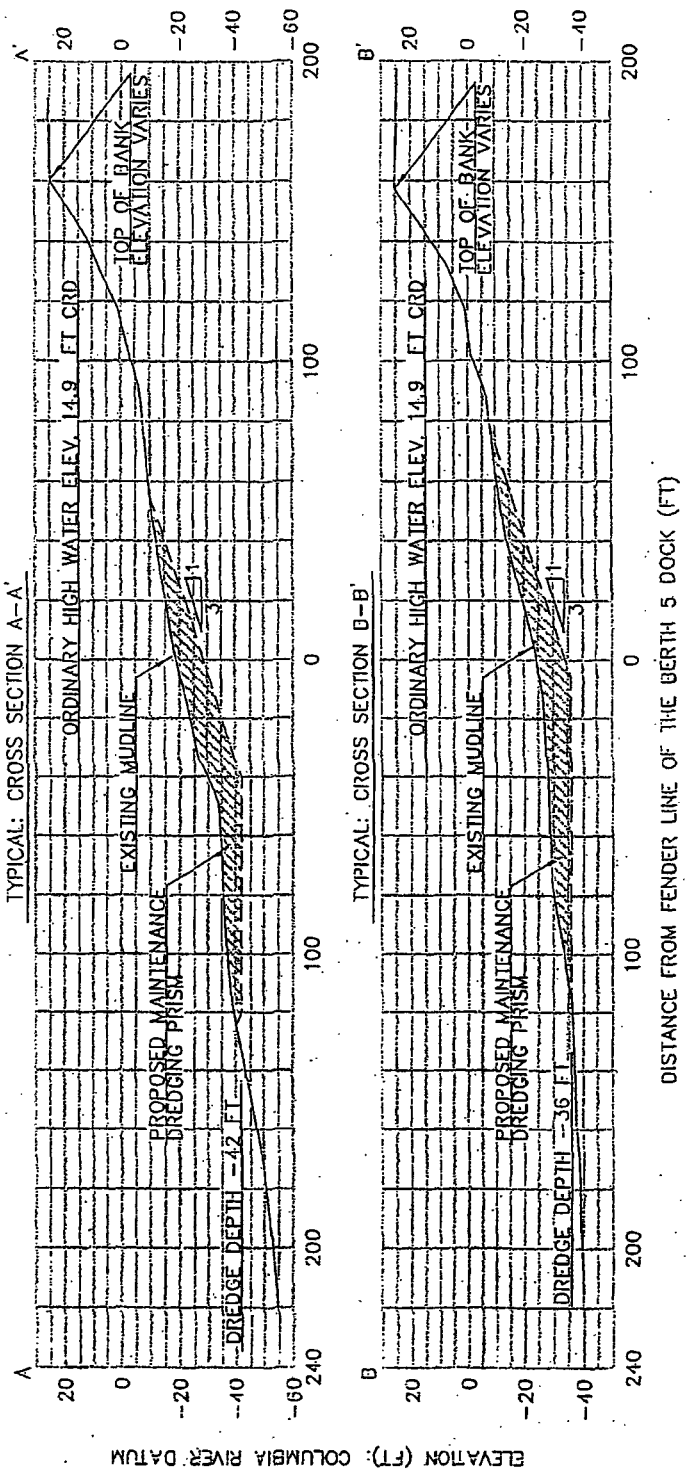
NOTE 4. SCHNITZER STEEL INDUSTRIES, INC. PROPOSES TO INITIALLY DREDGE AN ESTIMATED 61,000± CY AS SHOWN. ESTIMATED MAINTENANCE DREDGING TO REMOVE NATURALLY SHOALED MATERIALS INCLUDES UP TO 40,000 CY (I.E. 20,000± CY EVERY OTHER YEAR ON AVERAGE) IN SUBSEQUENT YEARS.

NOTE 5. DREDGING DEPTHS SHOWN ARE MAXIMUM DEPTHS AND INCLUDE ONE FOOT OF ADVANCED MAINTENANCE AND ONE FOOT OF ALLOWABLE OVERDEPTH DUE TO DREDGING INACCURACY.

NOTE 6. SCHNITZER STEEL INDUSTRIES, INC. PROPOSES TO DREDGE THE MATERIAL USING A CLAMSHELL BUCKET OPERATED FROM A FLOATING CRANE. DREDGED MATERIAL WILL BE PLACED IN APPROVED UPLAND LOCATIONS.

	PURPOSE: MAINTAIN NAVIGATION ACCESS AND BERTHS FOR SHIPS AND BARGES VERTICAL DATUM: COLUMBIA RIVER DATUM (CRD), CRD IS 1.6' ABOVE NGVD AT WILLAMETTE RIVER MILE 3.8 ADJACENT PROPERTY OWNERS: 1. NORTHWEST TERMINAL COMPANY 2. PORT OF PORTLAND	LATITUDE: 45° 36' 30" N LONGITUDE: 122° 46' 52" W HORIZONTAL DATUM: OREGON STATE PLANE COORDINATE SYSTEM, NORTH ZONE (NAD-27), U.S. SURVEY FEET	PROPOSED MAINTENANCE DREDGING AT INTERNATIONAL TERMINALS IN: WILLAMETTE RIVER AT: RIVER MILE 4.4 COUNTY OF: MULTNOMAH APPLICATION BY: SCHNITZER STEEL INDUSTRIES, INC. SHEET 2 OF 3 DATE: 6/03/03

SCHN0015940



PURPOSE: MAINTAIN NAVIGATION ACCESS AND BERTHS FOR SHIPS AND BARGES

VERTICAL DATUM: COLUMBIA RIVER DATUM (CRD), CRD IS 1.6' ABOVE NGVD AT WILLAMETTE RIVER MILE 3.8

ADJACENT PROPERTY OWNERS:
1. NORTHWEST TERMINAL COMPANY
2. PORT OF PORTLAND

LATITUDE: 45° 36' 30" N
LONGITUDE: 122° 45' 52" W

SCALE: AS SHOWN

PROPOSED MAINTENANCE DREDGING AT INTERNATIONAL TERMINALS

IN: WILLAMETTE RIVER
AT: RIVER MILE 3.8
COUNTY OF: MULTNOMAH
APPLICATION BY: SCHNITZER STEEL INDUSTRIES, INC.
SHEET 3 OF 3 DATE: 6/03/03

SCHN00157941

Appendix

ENCLOSURE 2

Oregon
Theodore R. Kulongoski, Governor

Department of Environmental Quality
811 SW Sixth Avenue
Portland, OR 97204-1390
503-229-5696
TTY 503-229-6993

February 5, 2004

REC'D FEB 0 6 2004

Ms. Mary J. Headley
U.S. Army Corps of Engineers
ATTN: CENPP-CO-GP
P.O. Box 2946
Portland, OR 97208-2946

Dear Ms. Headley,

The Department of Environmental Quality (DEQ) has reviewed U.S. Army Corps of Engineers (USACE, Corps) Permit Application numbers 1991-00099, and 1992-00812, [Division of State Lands (DSL) # RF1055, and 30895-RP respectively] for maintenance dredging. The applicant, Schnitzer Steel Industries, proposes to remove sedimentary materials from their International Terminals Slip, Berths 1, 2, and 3 (Project # 1991-00099); and Berths 4 and 5 (1992-00812). The project site is located at River Mile (RM) 3.8 and RM 4.1 respectively of the east shore Willamette River in Portland, Multnomah County, Oregon (Section 35, T2N/R1W).

The project involves maintenance dredging to a depth of -42 feet Columbia River Datum (CRD) to maintain safe navigational access and berthing for existing facilities at the International Terminals Slip. Over the life of the 5-year permit and certification the applicant proposes to dredge a total of 228,000 cubic yards (CY) from the facility (127,000 CY and 101,000 CY respectively). Initial dredge volumes are calculated at 138,000CY (77,000CY and 61,000 CY respectively). The remainder will be removed on alternate years from locations as required to maintain berthing depths. All dredged materials will be removed by clamshell dredge and transported by rail, truck, or barge to an approved upland facility.

The International Terminal is located in an area that the US Environmental Protection Agency (EPA) has designated an area of interest under the Superfund program. A letter dated November 2, 2001 from Sally Marquis, Manager, Aquatic Resources Unit, EPA, to Ms. Judy Linton, USACE, outlines protocol for conducting necessary maintenance dredging of facilities within the Superfund Site. It contains a reference to a "Superfund Condition" which has been provided to the Corps for inclusion in all Section 404 permits that they issue for the Portland Harbor area.

This project was determined by the Corps to be covered for ESA consultation under the *Programmatic Biological Opinion and Magnusson-Stevens Act Essential Fish Habitat Consultation for Standard Local Operating Procedures for Endangered Species (SLOPES II) for Certain Regulatory and Operations Activities Carried Out by the Department of Army Permits in Oregon and the North Shore Columbia River* dated July 8, 2003.

The Willamette River is classified as Water Quality Limited under Section 303(d) of the Federal Clean Water Act for the following parameters: Bacteria [Fecal Coliform (Fall/Winter/Spring)]; Toxics: [Tissue-Mercury (Year Round)]; Temperature (Summer); and Biological Criteria (Fish Skeletal Deformities).

The Willamette River supports salmonid spawning, rearing and migration.

Based on information provided by the applicant, DEQ does not anticipate any violations of State Water Quality Standards, including Oregon Administrative Rule (OAR) 340-041-0004, Antidegradation Policy for Surface Waters, provided the conditions which follow are incorporated into the permit.

1) **Fish protection/ODFW timing:** All in-water work shall occur within the Oregon Department of Fish and Wildlife's (ODFW) preferred time window, as specified in: *Oregon Guidelines for Timing of In-Water Work to Protect Fish and Wildlife Resources, June 2000.* Exceptions to these guidelines must be reviewed and approved by DSL and ODFW.

2) **Aquatic life movements:** No activity may substantially disrupt the movement of those species of aquatic life indigenous to the water body, including those species that normally migrate through the area.

3) **Turbidity/Erosion/Monitoring:** A *Water Quality Management Plan* (Plan) is contained in the Appendix to this Section 401 Water Quality Certification (WQC). The Plan and its contents are incorporated into and become a binding condition of the Certification. The Plan outlines: an effects-based turbidity standard; implementation of action level and stop-work level turbidity thresholds; monitoring protocols; and reporting requirements.

4) This Section 401 Water Quality Certification will expire concurrent with the USACE Section 404 permit for this project. The applicant will conduct an analysis of sediments, consistent with the Dredged Material Evaluation Framework (DMEF), for sediments they propose to remove during each separate dredging event authorized by this certification.

5) All dredged materials and associated water will be placed in barges equipped such that return water to the Willamette River is filtered before discharge.

6) No dredging of holes or sumps below maximum depth and subsequent redistribution of sediment by dredging, dragging, or other means is allowed.

7) If the dredging operation causes a water quality problem which results in distressed or dying fish, the operator shall immediately: cease operations; take appropriate corrective measures to prevent further environmental damage; collect fish specimens and water samples; and notify DEQ and the Oregon Department of Fish and Wildlife (ODFW).

8) Petroleum products, chemicals, or other deleterious waste materials shall not be allowed to enter waters of the State.

9) Fuel hoses, oil drums, oil or fuel transfer valves and fittings, etc., shall be checked regularly for drips or leaks, and shall be maintained in order to prevent spills into State waters.

10) In the event of a discharge of oil, fuel, or other chemicals into State waters, or onto land with a potential to enter State waters, containment and cleanup shall begin immediately and be completed as soon as possible.

11) Spills into State waters, or onto land with a potential to enter State waters, shall be reported immediately to the DEQ Spill Response Team [Northwest Region/Portland: (503) 229-5614].

12) DEQ reserves the option to modify, amend or revoke this WQC, as necessary, in the event new information indicates that the dredging/disposal activities are having a significant adverse impact on State water quality or critical fish resources.

13) A copy of this WQC letter shall be kept on the job site and readily available for reference by the Corps of Engineers, DEQ personnel, the contractor, and other appropriate state and local government inspectors.

14) This WQC is invalid if the project is operated in a manner not consistent with the project description contained in the Public Notice for certification.

15) DEQ is to have site access upon request.

16) If you are dissatisfied with the conditions contained in this certification, you may request a hearing before the Environmental Quality Commission. Such request must be made in writing to the Director of DEQ within 20 days of the mailing of this certification. You may also request written information about alternative dispute resolution services under Oregon Revised Statute 183.502, including mediation or any other collaborative problem-solving process.

The DEQ hereby certifies that this project complies with the Clean Water Act and state water quality standards, if the above conditions are made a part of the Federal permit.

The applicant shall notify the DEQ of any change in the ownership, scope, or construction methods of the project subsequent to certification. If you have any questions, please contact Tom Melville, (503) 229-5845.

Sincerely,

Michael T. Llewelyn, Administrator
Water Quality Division

T:TM.Certhead.91-099&92-812

cc: Applicant
Neil Mullane, DEQ
Kirk Jarvie, DSL

Appendix

International Terminals Water Quality Monitoring Plan

Prepared for

SCHNITZER STEEL INDUSTRIES, INC

Prepared by

Floyd Snider McCarthy, Inc.
83 South King Street
Suite 614
Seattle, Washington 98104

January 9, 2004

1.0 Introduction

This document presents the Water Quality Monitoring Plan (WQMP) for maintenance dredging of Berths 1 through 3, and Berths 4 and 5, of the International Terminals. The site is adjacent to Schnitzer Steel's facility, located in Portland, Oregon. This WQMP has been prepared to ensure compliance with Section 401 of the Clean Water Act and Oregon State Water Quality Standards (OAR 340-41).

Schnitzer Steel Industries, Inc. (Schnitzer) operates the International Terminals and associated berths. Berths within the project area currently support metal recycling operations and are also used to import bulk cargo such as manganese, pig iron, steel coils, and steel slabs.

2.0 Purpose

The WQMP was developed to evaluate water quality and ambient (background) conditions during maintenance dredging in order to ensure that turbidity will remain within acceptable limits outside of the project area and, if necessary, implement corrective actions to mitigate impacts to water quality. The project area includes multiple potential discharge points from the dredge and receiving barge (filtered return water).

This document defines the monitoring procedures that will be followed for water quality monitoring during maintenance dredging within the project area and provides a description of the Best Management Practices (BMPs) that will be implemented to ensure that potential water quality impacts will be minimized.

3.0 Best Management Practices

Maintenance dredging activities will be conducted during the Oregon Department of Fish and Wildlife's (ODFW) agreed upon in-water work windows as follows:

- July 1 through October 31 (any year with valid permits);
- January 1 through January 31, 2004; and
- During other times as needed. Activities will be coordinated with the ODFW and approved by the Oregon Division of State Lands.

In addition, the following BMPs will be used to minimize potential water quality impacts. Activities that occur during maintenance dredging with the potential to impact water quality include dredging, barge dewatering of sediments, and sediment offloading at a transload facility. BMPs that will be implemented during each of these activities to minimize potential water quality impacts are described below.

3.1 Dredging BMPs

Mechanical dredging of sediment has the potential to cause sediment resuspension, which can impact water quality and the aquatic environment. The following BMPs will be implemented to minimize potential impacts to the aquatic environment during dredging operations:

- The construction contractor will ensure that no fuel, garbage, or debris enters the waterway from the dredge, receiving barge, other vessels associated with the project.
- Dredging will be conducted using an environmental clamshell bucket that is closed, vented, and sealed in order to minimize the release and redistribution of dredged material to the water column during dredging. In the event that large woody debris or other obstructions must be removed from the dredge prism, the environmental bucket may be replaced by a bucket suitable for the removal.
- Dredging will be conducted using procedures that will minimize potential impacts to water and sediment quality to the extent practicable. These procedures include the following:
    - Slow dredge bucket deployment and retrieval will be required. The maximum rate of retrieval of the dredge bucket will be 2 feet per second for the first 20 feet off the bottom (where the highest potential for bottom sediment disturbance exists). For the remainder of the bucket ascent, the rate may increase up to a maximum of 4 feet per second.
    - The maximum rate of bucket descent will be 10 feet per second and the descent rate will decrease significantly until stopped at the designated depth of digging penetration.
    - "Sweeping" the post-dredge surface to smooth contours will not be allowed.
    - Stockpiling of material on the bottom will not be allowed (i.e., each time the bucket is closed it will be brought to the surface).
    - The bucket will be required to pause for several seconds at the water surface during retrieval to release excess water.
- Barges and other floating equipment shall be operated to avoid grounding on the riverbed or banks at any time.

3.2 Sediment Dewatering BMPs

Dredging efforts are required to be accomplished in a manner that minimizes the amount of water added to recovered sediment. In practice this is accomplished by taking full depth cuts whenever possible so that the dredge bucket is completely full of sediment and by pausing as the dredge bucket breaks the water surface during bucket retrieval to allow excess water to drain before sediment is discharged onto the receiving barge.

Dredged sediment placed onto the receiving barge will be allowed to passively dewater within the project area prior to being transferred upland. During barge dewatering activities, the following BMPs will be implemented to minimize potential water quality impacts:

- Return water draining from the receiving barge will be treated by filtering water through straw bales and/or geotextile fabric before returning to the waterway.
- Straw bales and geotextile fabric will be changed regularly to ensure efficient filtration of the return water.
- Barges will not be overfilled to the point where recovered material, including both sediment and water, overflows directly back to the waterway.

- During sediment dewatering, the receiving barge will remain within the project area.
- Return water from the barge will not be allowed to discharge to the waterway outside the project area (e.g., during transport to, or while stationed at the transload facility).

3.3 Dredged Material Offloading BMPs

The following BMPs will be implemented to prevent potential release of sediment at the transload facility and to prevent potential water quality impacts to the waterway:

- The clamshell bucket used during sediment offloading will not be allowed to swing directly over open water. A protective "capture barge", temporary structure, or spill apron will be placed along the swing pathway of the bucket to prevent material from entering the waterway.
- Railcars or containers used to transport dredged sediment will be lined with impermeable liners prior to being filled.
- The transload facility will be swept regularly to prevent potential spreading or release of sediment.
- Sediment will be removed from the outside of equipment and railcars by brushing or sweeping prior to leaving the transload facility.

4.0 Water Quality Monitoring Locations

Compliance water quality monitoring will be conducted at the compliance boundary located downstream of project area. Ambient water quality monitoring will also be conducted upstream from the project area to establish background conditions for the river.

Water quality compliance monitoring will be conducted at one location 150 feet directly downstream of the project area, as shown in Figure 4.1. The water quality monitoring station will be relocated, based on field conditions, in order to intercept any visible turbidity plumes originating from dredging operations. Monitoring stations will be located in the field using a Differential Global Positioning System (DGPS) on board the sampling vessel.

Ambient water quality monitoring will also be conducted at one station located within the waterway but at least 100 feet outside the influence of dredging operations (upstream from project area), as shown in Figure 4.1. Ambient monitoring stations will also be located in the field based on field conditions.

At each compliance or ambient monitoring location, turbidity will be measured and recorded at three depths:

- Shallow- within one meter of the water surface
- Mid depth
- Deep- one meter from the mudline

Measurements from all three depths will be recorded separately, but will be averaged to determine the turbidity concentration.

Turbidity thresholds were developed in 2001 by Ellis Ecological Services, Inc. (EES) and adopted by the Port of Portland (2001) for maintenance dredging at Terminal 2 and Terminal 5

on the Willamette River. These threshold levels were approved by the Oregon Department of Environmental Quality (ODEQ), the Oregon Division of State Lands, and the U.S. Army Corps of Engineers and were incorporated as a condition of the Terminal 2 and Terminal 5 maintenance dredging permits. The following threshold levels, developed by EES, are proposed for maintenance dredging at the International Terminals (Berths 1-5).

Table 4.1
Turbidity Threshold Levels for Maintenance Dredging at the International Terminals during the Allowed In-Water Work Periods

Turbidity Level (NTU)	July 1 – October 31	January 1 – January 31
Action Level (48 – hour average)	35	44
Stop Work Level (8-hour average)	135	144

Compliance monitoring results will be compared to the turbidity thresholds presented in Table 4.1 to evaluate water quality compliance. In the event that natural background turbidity exceeds the action level or stop work level in Table 4.1, then these levels will be 10 percent above background turbidity in accordance with Oregon State water quality standard (OAR 340-041-0445) for turbidity for the Willamette Basin. An exceedance of the threshold occurs only if the average turbidity exceeds the action level for a consecutive 48-hour period or the stop work level for a contiguous 8-hour period and the monitoring supervisor identifies the dredging operation as the cause of elevated turbidity.

5.0 Water Quality Monitoring Schedule

Turbidity will be monitored visually approximately every 4 hours during dredging operations. If visible turbidity observations indicate a potential problem then the *in situ* compliance-monitoring schedule will be adjusted to sample sooner than the next scheduled monitoring event.

In situ compliance monitoring for turbidity will be conducted twice daily for 3 days (intensive monitoring), at the water quality monitoring station located 150 feet downstream from the project area. Compliance monitoring results will be compared to turbidity thresholds (shown in Table 4.1) and ambient concentrations.

If exceedances are measured, another round of compliance monitoring and ambient monitoring will be initiated to verify the exceedance and ODEQ will be notified. If turbidity is consistently found to be acceptable during subsequent "intensive" monitoring, monitoring will return to visual-only monitoring every 4 hours during dredging operations. Apparent visual exceedances will trigger a return to intensive monitoring (twice daily instrument monitoring) until turbidity exceedances ceases. Visual-only monitoring every 4 hours would then resume.

6.0 Water Quality Monitoring Equipment and Methodology

Turbidity measurements will be collected using a turbidity meter. Prior to each use, the turbidity meter will be calibrated according to the manufacturer's instructions. When the interface screen shows no significant change in the readings, the probe will be considered calibrated and ready for monitoring. Turbidity readings will be measured at each of the three depths specified in

Section 4.0. All water quality monitoring field data, as described in Section 8.0, will be documented in the Water Quality Monitoring Report.

To satisfy QA/QC procedures, all field analyses will be conducted in duplicate at least 10 percent of the time. A significant difference (± 3 percent) in the replicate analyses will result in a recalibration of the field instrument. All field analyses will be recorded in logbooks and will be traceable to the specific person conducting the calibration.

7.0 Field Equipment Calibration and Preventative Maintenance

Field instruments will be properly operated, calibrated, and maintained by qualified personnel according to the manufacturer's guidelines and recommendations. Documentation of routine and special preventive maintenance and calibration information will be maintained in the appropriate field or laboratory logbook, and will be available upon request. Each maintenance and calibration logbook entry will include the date and initials of the individual performing the activity.

8.0 Documentation of Water Quality Monitoring Data

Field personnel will prepare daily field water quality monitoring reports detailing monitoring data collection activities and results. These field reports will include the following information:

- Depth of water at monitoring locations.
- Results of water quality monitoring instrumentation.
- Calibration sheets and notes for all daily instrument calibration.
- List of personnel on board vessel.
- Problems encountered that might affect data results.
- Weather at time of water quality monitoring.
- Date and time of exceedances, if any have occurred, and associated corrective actions.
- Station coordinates, including exact time and date of monitoring data documentation.

A Water Quality Monitoring Report will be prepared and submitted to ODEQ after maintenance dredging activities have been completed. This report will include:

- Depth of water at monitoring locations.
- Record of compliance and ambient monitoring results.
- Description of maintenance dredging activities occurring during water quality monitoring activities.
- Description of any monitoring results that exceeded compliance criteria including time and date of the exceedance.
- Description of corrective actions implemented to mitigate water quality impacts.
- Maps indicating water quality monitoring locations.

- Maps showing construction activity locations during water quality monitoring activities.

9.0 Corrective Action and Notification

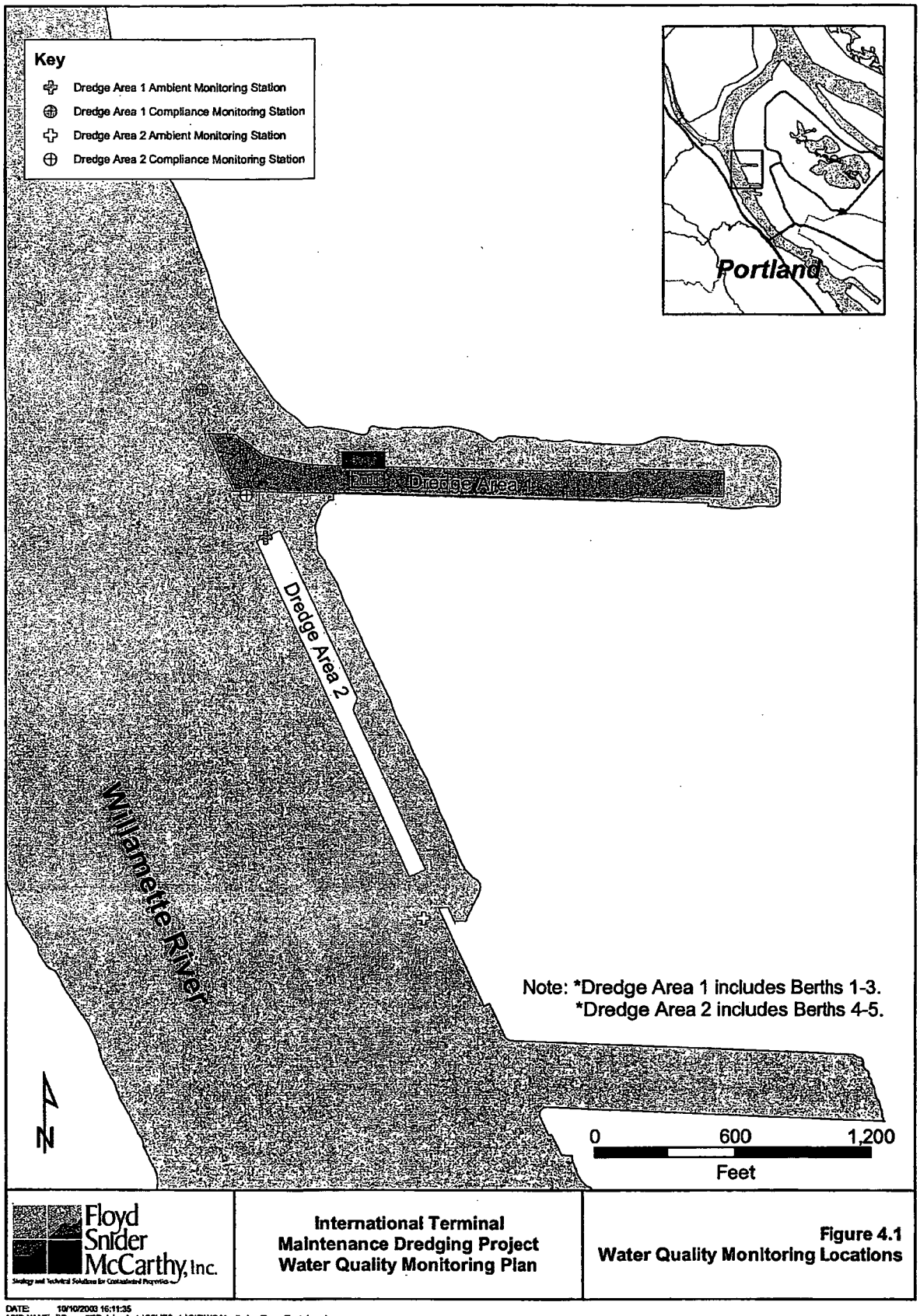
If compliance monitoring data indicates a turbidity exceedance of the water quality criteria at the compliance boundary, ODEQ will be notified immediately after the exceedance is confirmed and corrective actions will be evaluated. Corrective actions will include confirming that environmental buckets are properly functioning, modifying dredge procedures (such as changing dredge buckets, slowing or otherwise revising dredge rates, etc.) and/or modifying barge-dewatering procedures (e.g., replacing filter materials or increasing settling time). ODEQ will be informed of potential corrective actions.

10.0 References

Oregon Department of Environmental Quality (ODEQ). Statewide Water Quality Management Plan. Beneficial Uses, Polices, Standards and Treatment Criteria for Oregon. OAR 340-041, Water Pollution.

Port of Portland. 2001. Water Quality Management Plan for Maintenance Dredging. August 31.

Ellis Ecological Services, Inc. 2001. Preliminary Assessment of Potential Effects on Salmonids Associated with Turbidity Caused by Dredging in the Columbia and Willamette Rivers. Memorandum prepared for the Port of Portland. August 30.



Floyd Snider McCarthy, Inc.
Strategy and Technical Solutions for Contaminated Properties

International Terminal Maintenance Dredging Project Water Quality Monitoring Plan

Figure 4.1 Water Quality Monitoring Locations

DATE: 10/10/2003 16:11:35
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SCHN00157955

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Oregon Fish and Wildlife Office
2600 SE 98th Avenue, Suite 100
Portland, Oregon 97266
Phone: (503) 231-6179 FAX: (503) 231-6195

TAKE PRIDE IN AMERICA

Reply To: 8330.06454 (03)
File Name: Schnitzer dredging informal s7.wpd
TS Number: 04-1070

Mr. Lawrence C. Evans
Chief, Regulatory Branch
Portland District, Corps of Engineers
P.O. Box 2946
Portland, Oregon 97208-2946
Attn: Ms. Mary J. Headley

Re: Informal Consultation Request Regarding Maintenance Dredging at Berths 1, 2, 3, 4, and 5, Schnitzer Steel Industries, International Terminal Docks, Willamette River, Portland, Oregon (1-7-03-I-645, Corp Public Notices 1991-00099 and 1992-00812)

Dear Mr. Evans:

The Fish and Wildlife Service (Service) has reviewed the biological assessments (BAs) for the proposed maintenance dredging by Schnitzer Steel Industries (SSI) at its International Terminal docks in the Willamette River between River Miles 3.8 and 4.1, Multnomah County, Oregon. We received your letter on August 19, 2003. Of interest to the Service is your evaluation of impacts to bald eagles (*Haliaeetus leucocephalus*) and the plant, Howellia (*Howellia aquatilis*), both listed as threatened. A "no effect" determination has been made for Howellia; therefore, this species will not be considered further in this consultation. The BAs also address impacts to a number of fish species under the jurisdiction of NOAA Fisheries (formerly the National Marine Fisheries Service). The Federal nexus for the proposed project is the Army Corps of Engineers' (Corps) dredge and fill permits that would be issued under Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act. Our review and comments are provided pursuant to section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1536 *et seq.*) (Act). The BAs for maintenance dredging of Berths 1, 2, 3, 4 and 5 reached a determination of "may effect, but not likely to adversely affect" for bald eagles in the project area.

Consultation History

On September 22, 2003, the Service responded to your request for informal consultation with a letter stating that we did not concur with the above determination because of project contaminant concerns and possible exposure of bald eagles to contaminant levels that could adversely affect the species. We recommended that a close-lipped clamshell dredge be used to minimize the

ENCLOSURE 3

exposure of eagles and aquatic organisms, particularly salmonids, to such contaminants during dredging. On October 7, 2003, Jerald Ramsden of Parsons, Brinckerhoff, Quade, and Douglas (Parsons Brinckerhoff), consultants for the project applicant, responded via email to the Service's letter stating that dredging would occur using a close-lipped clamshell dredge and that, based on recommendations made in our review of the public notices for these dredging projects, they would develop a turbidity management plan, keep dredging depths to a minimum, and conduct maintenance dredging during the preferred inwater work period as approved by the Oregon Division of State Lands (ODSL). On October 9, 2003, the Service responded to Mr. Ramsden via email that we believed that the latter conditions described for dredging would help to minimize impacts on fish and wildlife resources, including bald eagles, but that we still believed it necessary to monitor for contaminants levels during and after dredging as recommended in our review of public notices 1991-00099 and 1992-00812. The Service received another letter from Parsons Brinckerhoff via the Corps on December 11, 2003, in which Parsons Brinckerhoff questioned the need for post-dredge sampling in light of their decision to use a close-lipped clamshell dredge and their belief that sediment sampling and analysis showed only minor exceedances of Dredged Material Evaluation Framework (DMEF) screening levels. The question of and need for monitoring will be addressed later in this letter.

Project Description

The project involves maintenance dredging at the SSI International Terminal docks on the Willamette River, Berths 1, 2, 3, 4, and 5. Berths 1, 2, and 3 would be dredged to a maximum depth of -42 feet Columbia River Datum (CRD), -38 feet CRD, or -24 feet CRD depending on the location of the berths within the slip. The initial dredged volume would be 77,000 cubic yards (cy) with another 50,000 cy being dredged in years two through five (25,000 cy every other year on average over the life of the permit). The proposed dredge footprint would cover about 9.6 acres with a maximum length of 2,250 feet and a maximum width of 270 feet. SSI Berths 4 and 5 would be dredged to a maximum depth of -42 feet CRD at Berth 4 and to -36 feet CRD at Berth 5. The initial dredged volume would be 61,000 cy with another 40,000 cy being dredged in years two through five (20,000 cy every other year on average over the life of the permit). For Berths 4 and 5, the dredge footprint would cover about 6.6 acres with a maximum length of 1,600 feet and maximum width of 220 feet. All dredging would be accomplished using a close-lipped clamshell bucket (as recently agreed to by Parsons Brinckerhoff) with transport of the dredged material to approved upland facilities or locations by barge, truck, or rail.

Species Account

Bald eagles nest in the tops of large trees and are strongly associated with aquatic habitats, rarely nesting in Oregon further than one mile from water and their primary prey of fish (Fish and Wildlife Service 1995). Foraging bald eagles require perch trees with an unobstructed view that are adjacent to the water; a dependence that makes bald eagles specifically vulnerable to aquatic-associated disturbance (Fish and Wildlife Service 1995).

In Oregon, the bald eagle breeding season can start as early as January 1 and may extend until August 31 each year. Bald eagles are particularly sensitive to human disturbance during the breeding season, sometimes resulting in the abandonment of nests (Fish and Wildlife Service 1986). Incubation lasts approximately 35 days, and the young are ready to fledge at about 11 to 12 weeks of age (Fish and Wildlife Service 1999). Parental care, however, may continue 4 to 11 weeks after the young have fledged. Wintering bald eagles use the Columbia and Willamette Rivers from November 15 to March 15.

Both adult and juvenile bald eagles are known to use the lower Willamette River and the Willamette/Columbia Rivers confluence area throughout the year. However, since the closest bald eagle nest is over 3 miles from the project site, construction is not expected to directly disrupt nesting activities or the rearing of young. No communal night roosts or perch trees are near the proposed dredging site; therefore, wintering bald eagles would not be affected by dredging that may occur during the wintering season. Your analysis finds that bald eagle foraging activities may be disrupted due to noise levels from the operation of heavy equipment but such disruptions are expected to be temporary in nature. Further, the BAs state that contaminant issues are minimal, do not exceed DMEF screening levels, and would not have significant effects on bald eagles or salmonids. The BA concludes that the project may affect bald eagles, but it is unlikely to affect them adversely.

Based on information provided in the BAs and subsequent correspondence with the Corps and the consultants for the project applicant, the Service concurs with the "may affect, not likely to adversely affect" determination for bald eagles. Our concurrence with this determination was made for the following reasons:

- A close-lipped clamshell bucket will be used to dredge the project sites with all dredged material transported to approved upland facilities or locations by barge, truck, or rail. Any incidences when the close-lipped bucket is not used (breakdowns, etc.) will be provided in a post-dredging report to the Service describing when, where, and the length of time the close-lipped dredge was out of service.
- A turbidity management plan will be developed using guidelines established by the Oregon Department of Environmental Quality (ODEQ).
- Dredging depths, including overdrafts, will be kept to a minimum.
- All inwater work will occur only during the preferred inwater work periods specified by the Oregon Department of Fish and Wildlife (ODFW) or at other times, as needed and coordinated with ODFW and the ODSL.

The requirements established under section 7(a)(2) and 7(c) of the Act have been met, thereby concluding the consultation process. If, however, over the life of the project, information becomes available that reveals effects of project construction that may affect listed species or critical habitat in a manner or to an extent not originally considered in this consultation process, we request reinitiation of consultation.

Clean Water Act and Fish and Wildlife Coordination Act Issues

The Service still considers that there is a need to conduct monitoring of the dredging activities at the SSI International Terminal docks to evaluate 1) the movement of surrounding contaminants into the project site and downstream as a result of dredging; 2) the effectiveness of the close-lipped clamshell dredge in removing contaminated material and minimizing dispersal of contaminated suspended sediment; and 3) the stability of the side-slope materials at the site during the dredging activity. This information will provide a more accurate picture of the impacts of dredging activities in contaminated sites on fish and wildlife resources, including anadromous fish and other listed species. This monitoring effort will directly address the Service's remaining concerns at the site, which are described below:

Overview of concerns

The sediment in the area to be dredged contains contaminants elevated above guidance values derived to protect aquatic life, and the Service is concerned that dredging will result in a contaminated layer at the surface of the dredge cut area. Specifically, removing material from the slips could cause contaminated surface material immediately adjacent to the slip to fall into the hole created during dredging and increase the availability of contaminants to anadromous and resident fish and their prey. The degree of contamination resulting from this "sideslope adjustment" is dependent on the current contamination concentrations in the surface layer and the stability of the sideslopes. Even small concentrations of contaminants such as DDT and its metabolites and polychlorinated biphenyls (PCBs) can bioaccumulate into higher organisms and result in adverse effects. The sampling effort (Floyd Snider McCarthy 2003) conducted to characterize the sediments at the site did not sufficiently address these concerns.

Specific concerns related to the sediment characterization (Floyd Snider McCarthy 2003)

1) It is unclear from the sediment characterization report for the site (Floyd Snider McCarthy 2003) what specific depth the surface samples collected represent. The characterization report states that "The first core segment reached from the top of the sediment to a depth corresponding to an elevation of -38 feet CRD . . . ." Therefore, it is unknown if most of the contamination is within the biologically active zone (e.g., up to 10 to 30 cm) or within a couple of feet of the surface. Materials sliding into the hole after dredging could result in contaminated sediment being exposed at the surface of the dredge cut and more available to organisms than prior to the dredge event.

2) The quality control (QC) information for DDT and its metabolites and PCBs is not sufficient to conclude that these chemicals would not pose a hazard to fish and wildlife if present in surface sediments. This concern is based on the following: 1) reporting limits were elevated for DDT, DDE, DDD, and PCBs; 2) matrix spike recoveries were reported as a range and could be below 30 percent for DDT, DDE, and DDD; and 3) unresolved matrix effects were noted in many surface samples for DDT (samples SS01..07, SS02..13, SS04..08, SS05..12) and once for DDE (sample SS05..12). Based on review of the QC information presented in Floyd Snider McCarthy

(2003), it is likely that DDT and its metabolites are higher in the surface sediments than actually reported. Specific information on these QC problems follows below:

- **Reporting limits:** As stated in section 8.3 of Floyd Snider McCarthy (2003), "Reporting limits for DDT re-analysis ranged from 3.4 to 6.3 µg/kg versus 1.0 µg/kg." The 1.0 µg/kg reporting limit is specified in the sampling protocol. The guidance value for DDT and its metabolites is listed as 6.9 µg/kg in the DMEF. This value represents a *summation* of DDT plus metabolites DDD and DDE. For most sample results, the reporting limits were not sufficient to quantify all three compounds, so only two where summed and the other excluded. Therefore, it is likely that most surface samples actually exceeded DMEF guidelines for DDTs. This is contrary to what is indicated in Floyd Snider McCarthy (2003).

- **Matrix spike recoveries:** Section 8.7 of the report indicates that matrix spike and matrix spike duplicate recoveries were 16 to 175 percent for DDT, 30 to 170 percent for DDD, and 12 to197 percent for DDE. However, the recoveries specific to these analyses for each sample are not mentioned. Therefore, we can assume that DDT, DDD, and DDE may have had recoveries as low as 12 to 30 percent. This is unacceptable and indicates that these compounds could be much higher in the samples than reported.

- **Unresolved matrix effects:** Four surface sediment samples (noted above) had DDT or DDE results flagged with a "UM." This flag is defined in Table 3.1 of Floyd Snider McCarthy (2003) as "indicates an analyte was not detected, and where a matrix effect was present." The Service is concerned that the detection limit was already elevated for this compound, and a matrix effect can mask the actual presence of the expected compound. The presence and concentration of the contaminant cannot be resolved without further analysis, yet it is likely present at a much higher concentration than the 1.0 µg/kg required reporting limit which was not achieved in the results. In Floyd Snider McCarthy (2003), the DDT and DDE concentrations flagged with UM were not included in the summation value used to compare to the total DDT guidance value. Therefore, the results from the collected sediment likely under-represent contamination in surface sediments at the site.

3) The use of background values in the sediment characterization report (section 3.4.3 and Table 3.5 of Floyd Snider McCarthy 2003) was inappropriate. The ODEQ would not consider sediment results from a large Superfund site as background concentrations for site specific needs as was done in the above analysis. Included in the Superfund site results are highly contaminated sediment concentrations resulting from a specific hazardous waste source. It is not appropriate or meaningful to use these samples to represent "background" or "baseline" contamination. Any comparison samples, if collected, should be taken immediately adjacent to the area to be dredged.

4) The Service does not consider the bioaccumulation triggers listed in the DMEF as representative of sediments in the lower Columbia and Willamette Rivers, where

bioaccumulation of compounds such as DDT and PCBs has been associated with reproductive problems for some species. The Service does not use the DMEF triggers as guidance values. Bioaccumulation of contaminants such as DDT and PCBs is a result of numerous factors, and any concentration of these contaminants has the potential to bioaccumulate. In addition, the bioaccumulation triggers listed in the DMEF (as well as all DMEF guidance) are currently under review and will likely be revised. The Service uses site specific information when making an assessment of bioaccumulation.

5) A letter dated December 4, 2003, from Parsons Brinckerhoff engineers to Mr. Lawrence Evans of the Corps makes comparisons to the Port of Portland turbidity monitoring efforts during a similar dredge event by the Port of Portland. The Service cooperated with the Port of Portland during the dredge events at Terminals 2 and 4. The Port conducted both turbidity measurements as NTUs and as total suspended solids as part of their monitoring plan. In addition, the Port of Portland conducted follow-up sampling to evaluate contaminants at the surface of the dredgecut after dredging at Terminal 4. The Service wishes to maintain consistency at all sites dredged within the Portland Harbor Superfund area when it is possible that surface contaminants could recontaminate a dredgecut, or when the dredgecut surface lies near a contaminated layer.

Recommendations

To rectify these unresolved issues, the Service recommends the collection of surface samples from the exposed surface of the dredgecut immediately after dredging, using the sampling protocols and tiered approach as described by the DMEF. If grain size indicates very little fines present and is representative of the native materials expected at that depth, then no further chemical testing would be necessary (as per Tier IIa of the DMEF). If fines are present, the Service recommends following the Tier IIb approach of the DMEF to determine contaminant concentrations, including meeting the specified minimum reporting limit for each analyte. For the compounds DDT, DDE, and DDD, minimum reporting limits should be 1.0 µg/kg for each compound. Follow-up analysis is necessary if unresolved matrix effects are noted in QC information.

If you have any questions or need more information, please contact Kathi Larson or Jeremy Buck at (503) 231-6179.

Sincerely,

for Kemper M. McMaster
State Supervisor

cc:
EPA
NOAA Fisheries
ODFW
ODEQ
ODSL

LITERATURE CITED

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Fish and Wildlife Service. 1999. Proposed rule to remove the bald eagle in the Lower 48 States from the list of endangered and threatened wildlife. Federal Register 64 (128):36454-36464.

Floyd Snyder McCarthy. 2003. International Terminal Sediment Data Report. Final report prepared for Schnitzer Steel Industries, Inc., June 26. Floyd Snyder McCarthy, Inc., Seattle, Washington.

Programmatic Biological Opinion (Opinion) issued by the National Marine Fisheries Service (NOAA Fisheries) on July 8, 2003, for Standard Local Operating Procedures for Endangered Species (SLOPES) for Certain Activities Requiring Department of the Army Permits in Oregon and the North Shore of the Columbia River.

To be exempt from the prohibitions of section 9 of the Endangered Species Act (ESA), the permittee must comply with the following terms and conditions, which implement the reasonable and prudent measures. These terms and conditions are non-discretionary, and in relevant part apply equally to proposed actions in all categories of activity.

2. **To implement reasonable and prudent measure #2** (general conditions for surveying, exploration, construction, operation and maintenance), the Corps shall ensure that:

a. Exclusions. The following types of exploration and construction actions are not authorized, unless otherwise approved in writing by NOAA Fisheries.

i. Exploration and construction actions, including release of construction discharge water, within 300 feet upstream of active spawning areas or areas with native submerged aquatic vegetation as determined by a preconstruction survey.

ii. Exploration actions in estuaries that cannot be conducted from an existing bridge, dock, or wharf.

b. Hydraulic surveys. Hydraulic measurements that require access to the wetted channel will be done outside of the spawning season, or will have a fisheries biologist verify that there are no redds present at the site. If dye must be used, only non-toxic vegetable dyes is authorized; use of short pieces of plastic ribbon to determine flow patterns is not authorized.

c. Minimum area. Confine construction impacts to the minimum area necessary to complete the project.

d. Timing of in-water work. Work below the bankfull elevation[1] will be completed using the most recent ODFW or the Corps Seattle District preferred in-water work period, as appropriate for the project area, unless otherwise approved in writing by NOAA Fisheries.

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[1] 'Bankfull elevation' means the bank height inundated by a 1.5 to 2-year average recurrence interval and may be estimated by morphological features such average bank height, scour lines and vegetation limits.

ENCLOSURE 4
(4a)

e. Cessation of work. Cease project operations under high flow conditions that may result in inundation of the project area, except for efforts to avoid or minimize resource damage.

f. Fish screens. Have a fish screen installed, operated and maintained according to NOAA Fisheries' fish screen criteria[2] on each water intake used for project construction, including pumps used to isolate an in-water work area. Screens for water diversions or intakes that will be used for irrigation, municipal or industrial purposes, or any use besides project construction are not authorized.

g. Fish passage. Provide passage for any adult or juvenile salmonid species present in the project area during construction, unless otherwise approved in writing by NOAA Fisheries, and after construction for the life of the project. Upstream passage is not required during construction if it did not previously exist.

h. Pollution and Erosion Control Plan. Prepare and carry out a pollution and erosion control plan to prevent pollution caused by surveying or construction operations. The plan must be available for inspection on request by Corps or NOAA Fisheries.

i. Plan Contents. The pollution and erosion control plan will contain the pertinent elements listed below, and meet requirements of all applicable laws and regulations.

(1) The name and address of the party(s) responsible for accomplishment of the pollution and erosion control plan.

(2) Practices to prevent erosion and sedimentation associated with access roads, stream crossings, drilling sites, construction sites, borrow pit operations, haul roads, equipment and material storage sites, fueling operations, staging areas, and roads being decommissioned.

(3) Practices to confine, remove and dispose of excess concrete, cement, grout, and other mortars or bonding agents, including measures for washout facilities.

(4) A description of any regulated or hazardous products or materials that will be used for the project, including procedures for inventory, storage, handling, and monitoring.

(5) A spill containment and control plan with notification procedures, specific cleanup and disposal instructions for different products, quick response

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[2] National Marine Fisheries Service, *Juvenile Fish Screen Criteria* (revised February 16, 1995) and *Addendum: Juvenile Fish Screen Criteria for Pump Intakes* (May 9, 1996) (guidelines and criteria for migrant fish passage facilities, and new pump intakes and existing inadequate pump intake screens) (http://www.nwr.noaa.gov/1hydrop/hydroweb/ferc.htm).

containment and cleanup measures that will be available on the site, proposed methods for disposal of spilled materials, and employee training for spill containment.

(6) Practices to prevent construction debris from dropping into any stream or water body, and to remove any material that does drop with a minimum disturbance to the streambed and water quality.

ii. Inspection of erosion controls. During construction, monitor instream turbidity and inspect all erosion controls daily during the rainy season and weekly during the dry season, or more often as necessary, to ensure the erosion controls are working adequately.[3]

(1) If monitoring or inspection shows that the erosion controls are ineffective, mobilize work crews immediately to make repairs, install replacements, or install additional controls as necessary.

(2) Remove sediment from erosion controls once it has reached 1/3 of the exposed height of the control.

i. Construction discharge water. Treat all discharge water created by construction (*e.g.*, concrete washout, pumping for work area isolation, vehicle wash water, drilling fluids) as follows.

i. Water quality. Design, build and maintain facilities to collect and treat all construction discharge water, including any contaminated water produced by drilling, using the best available technology applicable to site conditions. Provide treatment to remove debris, nutrients, sediment, petroleum hydrocarbons, metals and other pollutants likely to be present.

ii. Discharge velocity. If construction discharge water is released using an outfall or diffuser port, velocities may not exceed 4 feet per second, and the maximum size of any aperture may not exceed one inch.

iii. Pollutants. Do not allow pollutants including green concrete, contaminated water, silt, welding slag, sandblasting abrasive, or grout cured less than 24 hours to contact any wetland or the 2-year floodplain.

iv. Drilling discharge. All drilling equipment, drill recovery and recycling pits, and any waste or spoil produced, will be completely isolated to prevent drilling fluids or other wastes from entering the stream.

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[3] 'Working adequately' means that project activities do not increase ambient stream turbidity by more than 10% above background 100 feet below the discharge, when measured relative to a control point immediately upstream of the turbidity causing activity.

(1) All drilling fluids and waste will be completely recovered then recycled or disposed to prevent entry into flowing water.

(2) Drilling fluids will be recycled using a tank instead of drill recovery/recycling pits, whenever feasible.

(3) When drilling is completed, attempts will be made to remove the remaining drilling fluid from the sleeve (e.g., by pumping) to reduce turbidity when the sleeve is removed.

j. Piling installation. Install temporary and permanent pilings as follows.

i. Minimize the number and diameter of pilings, as appropriate, without reducing structural integrity.

ii. Repairs, upgrades, and replacement of existing pilings consistent with these terms and conditions are allowed.

iii. In addition to repairs, upgrades, and replacements of existing pilings, up to five single pilings or one dolphin consisting of three to five pilings may be added to an existing facility per in-water construction period.

iv. Drive each piling as follows to minimize the use of force and resulting sound pressure.

(1) Hollow steel pilings greater than 24 inches in diameter, and Hpiles larger than designation HP24, are not authorized under this Opinion.

(2) When impact drivers will be used to install a pile, use the smallest driver and the minimum force necessary to complete the job. Use a drop hammer or a hydraulic impact hammer, whenever feasible and set the drop height to the minimum necessary to drive the piling.

(3) When using an impact hammer to drive or proof steel piles, one of the following sound attenuation devices will be used to reduce sound pressure levels by 20 decibels.

(a) Place a block of wood or other sound dampening material between the hammer and the piling being driven.

(b) If currents are 1.7 miles per hour or less, surround the piling being driven by an unconfined bubble curtain that will distribute

small air bubbles around 100% of the piling perimeter for the full depth of the water column.[4]

(c) If currents greater than 1.7 miles per hour, surround the piling being driven by a confined bubble curtain (*e.g.*, a bubble ring surrounded by a fabric or metal sleeve) that will distribute air bubbles around 100% of the piling perimeter for the full depth of the water column.

(d) Other sound attenuation devices as approved in writing by NOAA Fisheries.

k. Piling removal. If a temporary or permanent piling will be removed, the following conditions apply.

i. Dislodge the piling with a vibratory hammer.

ii. Once loose, place the piling onto the construction barge or other appropriate dry storage site.

iii. If a treated wood piling breaks during removal, either remove the stump by breaking or cutting 3 feet below the sediment surface or push the stump in to that depth, then cover it with a cap of clean substrate appropriate for the site.

iv. Fill the holes left by each piling with clean, native sediments, whenever feasible.

l. Treated wood.

i. Projects using treated wood[5] that may contact flowing water or that will be placed over water where it will be exposed to mechanical abrasion or where leachate may enter flowing water are not authorized, except for pilings installed following NOAA Fisheries' guidelines.[6] Treated wood pilings must incorporate

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[4] For guidance on how to deploy an effective, economical bubble curtain, see, Longmuir, C. and T. Lively, *Bubble Curtain Systems for Use During Marine Pile Driving*, Fraser River Pile and Dredge LTD, 1830 River Drive, New Westminster, British Columbia, V3M 2A8, Canada. Recommended components include a high volume air compressor that can supply more than 100 pounds per square inch at 150 cubic feet per minute to a distribution manifold with 1/16 inch diameter air release holes spaced every 3/4 inch along its length. An additional distribution manifold is needed for each 35 feet of water depth.

[5] 'Treated wood' means lumber, pilings, and other wood products preserved with alkaline copper quaternary (ACQ), ammoniacal copper arsenate (ACA), ammoniacal copper zinc arsenate (ACZA), copper naphthenate, chromated copper arsenate (CCA), pentachlorophenol, or creosote.

[6] Letter from Steve Morris, National Marine Fisheries Service, to W.B. Paynter, Portland District, U.S. Army Corps of Engineers (December 9, 1998) (transmitting a document titled *Position Document for the Use of*

design features to minimize abrasion of the treated wood from vessels, floats or other objects that may cause abrasion
of the piling.

ii. Visually inspect treated wood before final placement to detect and replace wood with surface residues and/or bleeding of preservative.

iii. Projects that require removal of treated wood will use the following precautions.

(1) Treated wood debris. Take care to ensure that no treated wood debris falls into the water. If treated wood debris does fall into the water, remove it immediately.

(2) Disposal of treated wood debris. Dispose of all treated wood debris removed during a project, including treated wood pilings, at an upland facility approved for hazardous materials of this classification. Do not leave a treated wood piling in the water or stacked on the stream bank.

m. Preconstruction activity. Complete the following actions before significant[7] alteration of the project area.

i. Marking. Flag the boundaries of clearing limits associated with site access and construction to prevent ground disturbance of critical riparian vegetation, wetlands and other sensitive sites beyond the flagged boundary.

ii. Emergency erosion controls. Ensure that the following materials for emergency erosion control are onsite.

(1) A supply of sediment control materials (*e.g.*, silt fence, straw bales[8]).

(2) An oil-absorbing, floating boom whenever surface water is present.

iii. Temporary erosion controls. All temporary erosion controls will be inplace and appropriately installed downslope of project activity within the riparian area until site restoration is complete.

Treated Wood in Areas within Oregon Occupied by Endangered Species Act Proposed and Listed Anadromous Fish Species, National Marine Fisheries Service, December 1998).

[7] 'Significant' means an effect can be meaningfully measured, detected, or evaluated.

[8] When available, certified weed-free straw or hay bales will be used to prevent introduction of noxious weeds.

n. Temporary access roads and drilling pads. All temporary access roads and drilling pads will be constructed as follows.

i. Existing ways. Use existing roadways, travel paths, and drilling pads whenever possible, unless construction of a new way or drilling pad would result in less habitat take. When feasible, eliminate the need for an access road by walking a tracked drill or spider hoe to a survey site, or lower drilling equipment to a survey site using a crane.

ii. Steep slopes. Temporary roads or drilling pads built mid-slope or on slopes steeper than 30% are not authorized.

iii. Minimizing soil disturbance and compaction. Minimize soil disturbance and compaction whenever a new temporary road or drill pad is necessary within 150 feet[9] of a stream, water body or wetland by clearing vegetation to ground level and placing clean gravel over geotextile fabric, unless otherwise approved in writing by NOAA Fisheries.

iv. Temporary stream crossings.

(1) Minimize the number of temporary stream crossings.

(2) Design temporary road crossings as follows.

(a) Survey and map any potential spawning habitat within 300 feet downstream of a proposed crossing.

(b) Do not place a stream crossing at known or suspected spawning areas, or within 300 feet upstream of such areas if spawning areas may be affected.

(c) Design the crossing to provide for foreseeable risks (*e.g.*, flooding and associated bedload and debris, to prevent the diversion of streamflow out of the channel and down the road if the crossing fails).

(d) Vehicles and machinery will cross riparian areas and streams at right angles to the main channel wherever possible.

v. Obliteration. When the project is complete, obliterate all temporary access roads that will not be in footprint of a new bridge or other permanent structure, stabilize the soil, and revegetate the site. Abandon and restore temporary roads in wet or flooded areas by the end of the inwater work period.

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[9] Distances from a stream or water body are measured horizontally from, and perpendicular to, the bankfull elevation, the edge of the channel migration zone, or the edge of any associated wetland, whichever is greater. 'Channel migration zone' means the area defined by the lateral extent of likely movement along a stream reach as shown by evidence of active stream channel movement over the past 100 years (e.g., alluvial fans or floodplains formed where the channel gradient decreases, the valley abruptly widens, or at the confluence of larger streams).

o. Heavy Equipment. Restrict use of heavy equipment as follows:

i. Choice of equipment. When heavy equipment will be used, the equipment selected will have the least adverse effects on the environment (*e.g.*, minimally sized, low ground pressure equipment).

ii. Vehicle and material staging. Store construction materials, and fuel, operate, maintain and store vehicles as follows.

(1) To reduce the staging area and potential for contamination, ensure that only enough supplies and equipment to complete a specific job will be stored on-site.

(2) Complete vehicle staging, cleaning, maintenance, refueling, and fuel storage in a vehicle staging area placed 150 feet or more from any stream, water body or wetland, unless otherwise approved in writing by NOAA Fisheries.

(3) Inspect all vehicles operated within 150 feet of any stream, water body or wetland daily for fluid leaks before leaving the vehicle staging area. Repair any leaks detected in the vehicle staging area before the vehicle resumes operation. Document inspections in a record that is available for review on request by Corps or NOAA Fisheries.

(4) Before operations begin and as often as necessary during operation, steam clean all equipment that will be used below bankfull elevation until all visible external oil, grease, mud, and other visible contaminates are removed.

(5) Diaper all stationary power equipment (*e.g.*, generators, cranes, stationary drilling equipment) operated within 150 feet of any stream, waterbody or wetland to prevent leaks, unless suitable containment is provided to prevent potential spills from entering any stream or waterbody.

p. Site preparation. Conserve native materials for site restoration.

i. If possible, leave native materials where they are found.
ii. If materials are moved, damaged or destroyed, replace them with a functional equivalent during site restoration.

iii. Stockpile any large wood[10], native vegetation, weed-free topsoil, and native channel material displaced by construction for use during site restoration.

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[10] For purposes of this Opinion only, 'large wood' means a tree, log, or rootwad big enough to dissipate stream energy associated with high flows, capture bedload, stabilize streambanks, influence channel characteristics, and otherwise support aquatic habitat function, given the slope and bankfull channel width of the stream in which the

q. Isolation of in-water work area. If adult or juvenile fish are reasonably certain to be present, or if the work area is 300 feet upstream of spawning habitats, completely isolate the work area from the active flowing stream using inflatable bags, sandbags, sheet pilings, or similar materials, unless otherwise approved in writing by NOAA Fisheries.

r. Capture and release. Before and intermittently during pumping to isolate an inwater work area, attempt to capture and release fish from the isolated area using trapping, seining, electrofishing, or other methods as are prudent to minimize risk of injury.

i. The entire capture and release operation must be conducted or supervised by a fishery biologist experienced with work area isolation and competent to ensure the safe handling of all ESA-listed fish.

ii. Do not use electrofishing if water temperatures exceed 18$_o$C.

iii. If electrofishing equipment is used to capture fish, comply with NOAA Fisheries' electrofishing guidelines."

iv. Handle ESA-listed fish with extreme care, keeping fish in water to the maximum extent possible during seining and transfer procedures to prevent the added stress of out-of-water handling.

v. Transport fish in aerated buckets or tanks.

vi. Release fish into a safe release site as quickly as possible, and as near as possible to capture sites.

vii. Do not transfer ESA-listed fish to anyone except NOAA Fisheries personnel, unless otherwise approved in writing by NOAA Fisheries.

viii. Obtain all other Federal, state, and local permits necessary to conduct the capture and release activity.

ix. Allow NOAA Fisheries or its designated representative to accompany the capture team during the capture and release activity, and to inspect the team's capture and release records and facilities.

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wood occurs. See, Oregon Department of Forestry and Oregon Department of Fish and Wildlife, *A Guide to Placing Large Wood in Streams*, May 1995 (www.odf.state.or.us/FP/RefLibrary/LargeWoodPlacemntGuide5-95.doc).

[11] National Marine Fisheries Service, *Backpack Electrofishing Guidelines* (December 1998) (http://www.nwr.noaa.gov/1salmon/salmesa/pubs/electrog.pdf).

s. Earthwork. Complete earthwork (including drilling, excavation, dredging, filling and compacting) as quickly as possible.

i. Drilling and sampling. If drilling, boring or jacking is used, the following conditions apply.

(1) Isolate drilling operations in wetted stream channels using a steel pile, sleeve or other appropriate isolation method to prevent drilling fluids from contacting water.

(2) If it is necessary to drill through a bridge deck, use containment measures to prevent drilling debris from entering the channel.

(3) If directional drilling is used, the drill, bore or jack hole will span the channel migration zone and any associated wetland.

(4) Sampling and directional drill recovery/recycling pits, and any associated waste or spoils will be completely isolated from surface waters, off-channel habitats and wetlands. All waste or spoils must be covered if precipitation is falling or imminent. All drilling fluids and waste will be recovered and recycled or disposed to prevent entry into flowing water.

(5) If a drill boring conductor breaks and drilling fluid or waste is visible in water or a wetland, all drilling activity will cease pending written approval from NOAA Fisheries to resume drilling.

ii. Site stabilization. Stabilize all disturbed areas, including obliteration of temporary roads, following any break in work unless construction will resume within four days.

iii. Source of materials. Obtain boulders, rock, woody materials and other natural construction materials used for the project outside the riparian area.

t. Stormwater management. Prepare and carry out a stormwater management plan for any project that will produce a new impervious surface or a land cover conversion that slows the entry of water into the soil. The plan must be available for inspection on request by Corps or NOAA Fisheries.

i. Plan contents. The goal is to avoid and minimize adverse effects due to the quantity and quality of stormwater runoff for the life of the project by maintaining or restoring natural runoff conditions. The plan will meet the following criteria and contain the pertinent elements listed below, and meet requirements of all applicable laws and regulations.

(1) A system of management practices and, if necessary, structural facilities, designed to complete the following functions:

(a) Minimize, disperse and infiltrate stormwater runoff onsite using sheet flow across permeable vegetated areas to the maximum extent possible without causing flooding, erosion impacts, or long-term adverse effects to groundwater.

(b) Pretreat stormwater from pollution generating surfaces, including bridge decks, before infiltration or discharge into a freshwater system, as necessary to minimize any nonpoint source pollutant (*e.g.*, debris, sediment, nutrients, petroleum hydrocarbons, metals) likely to be present in the

volume of runoff predicted from a 6-month, 24-hour storm.[12]

(c) Ensure that the duration of post project discharge matches the pre-developed discharge rates from 50% of the 2-year peak flow up to the 50-year peak flow.

(2) For projects that require engineered facilities to meet stormwater requirements, use a continuous rainfall/runoff model, if available for the project area, to calculate stormwater facility water quality and flow control rates.

(3) Use permeable pavements for load-bearing surfaces, including multiple-use trails, to the maximum extent feasible based on soil, slope, and traffic conditions.

(4) Install structural facilities outside wetlands or the riparian buffer area[13] whenever feasible, otherwise, provide compensatory mitigation to offset any long-term adverse effects.

(5) Document completion of the following activities according to a regular schedule for the operation, inspection and maintenance of all structural

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[12] A 6-month, 24-hour storm may be assumed to be 72% of the 2-year, 24-hour amount. See, Washington State Department of Ecology (2001), Appendix I-B-1.

[13] For purposes of this Opinion only, 'riparian buffer area' means land: (1) Within 150 feet of any natural water occupied by listed salmonids during any part of the year or designated as critical habitat; (2) within 100 feet of any natural water within 1/4 mile upstream of areas occupied by listed salmonids or designated as critical habitat and that is physically connected by an above-ground channel system such that water, sediment, or woody material delivered to such waters will eventually be delivered to water occupied by listed salmon or designated as critical habitat; and (3) within 50 feet of any natural water upstream of areas occupied by listed salmonids or designated as critical habitat and that is physically connected by an above-ground channel system such that water, sediment, or woody material delivered to such waters will eventually be delivered to water occupied by listed salmon or designated as critical habitat. 'Natural water' means all perennial or seasonal waters except water conveyance systems that are artificially constructed and actively maintained for irrigation.

facilities and conveyance systems, in a log available for inspection on request by the Corps and NOAA Fisheries.

(a) Inspect and clean each facility as necessary to ensure that the design capacity is not exceeded, heavy sediment discharges are prevented, and whether improvements in operation and maintenance are needed.

(b) Promptly repair any deterioration threatening the effectiveness of any facility.

(c) Post and maintain a warning sign on or next to any storm drain inlet that says, as appropriate for the receiving water, 'Dump No Waste - Drains to Ground Water, Streams, or Lakes.'

(d) Only dispose of sediment and liquid from any catch basin in an approved facility.

ii. Runoffs/discharge into a freshwater system. When stormwater runoff will be discharged directly into fresh surface water or a wetland, or indirectly through a conveyance system, the following requirements apply.

(1) Maintain natural drainage patterns and, whenever possible, ensure that discharges from the project site occur at the natural location.

(2) Use a conveyance system comprised entirely of manufactured elements (*e.g.*, pipes, ditches, outfall protection) that extends to the ordinary high water line of the receiving water.

(3) Stabilize any erodible elements of this system as necessary to prevent erosion.

(4) Do not divert surface water from, or increase discharge to, an existing wetland if that will cause a significant adverse effect to wetland hydrology, soils or vegetation.

(5) The velocity of discharge water released from an outfall or diffuser port may not exceed 4 feet per second, and the maximum size of any aperture may not exceed one inch.

u. Site restoration. Prepare and carry out a site restoration plan as necessary to ensure that all streambanks, soils and vegetation disturbed by the project are cleaned up and restored as follows. Make the written plan available for inspection on request by the Corps or NOAA Fisheries.

i. General considerations.

(1) Restoration goal. The goal of site restoration is renewal of habitat access, water quality, production of habitat elements (*e.g.*, large woody debris), channel conditions, flows, watershed conditions and other ecosystem processes that form and maintain productive fish habitats.

(2) Streambank shaping. Restore damaged streambanks to a natural slope, pattern and profile suitable for establishment of permanent woody vegetation, unless precluded by pre-project conditions (*e.g.*, a natural rock wall).

(3) Revegetation. Replant each area requiring revegetation before the first April 15 following construction. Use a diverse assemblage of species native to the project area or region, including grasses, forbs, shrubs and trees. Noxious or invasive species may not be used.

(4) Pesticides. Take of ESA-listed species caused by any aspect of pesticide use is not included in the exemption to the ESA take prohibitions provided by this incidental take statement. Pesticide use must be evaluated in an individual consultation, although mechanical or other methods may be used to control weeds and unwanted vegetation.

(5) Fertilizer. Do not apply surface fertilizer within 50 feet of any stream channel.

(6) Fencing. Install fencing as necessary to prevent access to revegetated sites by livestock or unauthorized persons.

ii. Plan contents. Include each of the following elements.

(1) Responsible party. The name and address of the party(s) responsible for meeting each component of the site restoration requirements, including providing and managing any financial assurances and monitoring necessary to ensure restoration success.

(2) Baseline information. This information may be obtained from existing sources (*e.g.*, land use plans, watershed analyses, subbasin plans), where available.

(a) A functional assessment of adverse effects, *i.e.*, the location, extent and function of the riparian and aquatic resources that will be adversely affected by construction and operation of the project.

(b) The location and extent of resources surrounding the restoration site, including historic and existing conditions.

(3) Goals and objectives. Restoration goals and objectives that describe the extent of site restoration necessary to offset adverse effects of the project, by aquatic resource type.

(4) Performance standards. Use these standards to help design the plan and to assess whether the restoration goal is met. While no single criterion is sufficient to measure success, the intent is that these features should be present within reasonable limits of natural and management variation.

(a) Bare soil spaces are small and well dispersed.
(b) Soil movement, such as active rills or gullies and soil deposition around plants or in small basins, is absent or slight and local.
(c) If areas with past erosion are present, they are completely stabilized and healed.
(d) Plant litter is well distributed and effective in protecting the soil with few or no litter dams present.
(e) Native woody and herbaceous vegetation, and germination microsites, are present and well distributed across the site.
(f) Vegetation structure is resulting in rooting throughout the available soil profile.
(g) Plants have normal, vigorous growth form, and a high probability of remaining vigorous, healthy and dominant over undesired competing vegetation.
(h) High impact conditions confined to small areas necessary access or other special management situations.
(i) Streambanks have less than 5% exposed soils with margins anchored by deeply rooted vegetation or coarse-grained alluvial debris.

(j) Few upland plants are in valley bottom locations, and a continuous corridor of shrubs and trees provide shade for the entire streambank.

(5) Work plan. Develop a work plan with sufficient detail to include a description of the following elements, as applicable.

(a) Boundaries for the restoration area.
(b) Restoration methods, timing, and sequence.
(c) Water supply source, if necessary.
(d) Woody native vegetation appropriate to the restoration site[14]. This must be a diverse assemblage of species that are native to the

[14] Use references sites to select vegetation for the mitigation site whenever feasible. Historic reconstruction, vegetation models, or other ecologically-based methods may also be used as appropriate.

project area or region, including grasses, forbs, shrubs and trees. This may include allowances for natural regeneration from an existing seed bank or planting.
(e) A plan to control exotic invasive vegetation.
(f) Elevation(s) and slope(s) of the restoration area to ensure they conform with required elevation and hydrologic requirements of target plant species.
(g) Geomorphology and habitat features of stream or other open water.
(h) Site management and maintenance requirements.

(6) Five-year monitoring and maintenance plan.

(a) A schedule to visit the restoration site annually for 5 years or longer as necessary to confirm that the performance standards are achieved. Despite the initial 5-year planning period, site visits and monitoring will continue from year-to- year until the Corps certifies that site restoration performance standards have been met.

(b) During each visit, inspect for and correct any factors that may prevent attainment of performance standards (*e.g.*, low plant survival, invasive species, wildlife damage, drought).

(c) Keep a written record to document the date of each visit, site conditions and any corrective actions taken.

v. Long-term adverse effects. Prepare and carry out a compensatory mitigation plan as necessary to ensure the proposed action meets the goal of 'no net loss' aquatic functions by offsetting unavoidable long-term adverse effects to streams and other aquatic habitats. Make the plan available for inspection on request by Corps or NOAA Fisheries.

i. Actions of concern. The following actions require a Compensatory Mitigation Plan to offset long-term adverse effects.

(1) Riparian and aquatic habitats displaced by construction of structural stormwater facilities, new boat ramp, or scour protection

(*e.g.*, a footing facing, head wall, or other protection necessary to prevent scouring or downcutting of a culvert, water intake, utility line, or bridge support).
(2) Maintenance dredging in water closer than 50 feet from shore, or in waters less than 20 feet deep.[15]

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[15] Depth in tidal waters is measured from mean lower low water (MLLW).

(3) Other activities that prevent development of properly functioning condition of natural habitat processes.

ii. General considerations.

(1) Make mitigation plans compatible with adjacent land uses or, if necessary, use an upland buffer to separate mitigation areas from developed areas or agricultural lands.

(2) Base the level of required mitigation on a functional assessment of adverse effects of the proposed project, and functional replacement (*i.e.*, 'no net loss of function'), whenever feasible, or a minimum one-to-one linear foot or acreage replacement.

(3) Acceptable mitigation includes reestablishment or rehabilitation of natural or historic habitat functions when self-sustaining, natural processes are used to provide the functions. Actions that require construction of permanent structures, active maintenance, creation of habitat functions where they did not historically exist, or that simply preserve existing functions are not authorized, unless otherwise approved in writing by NOAA Fisheries.

(4) Whenever feasible, complete mitigation before, or concurrent with, project construction to reduce temporal loss of aquatic functions and simplify compliance.

(5) When project construction is authorized before mitigation is completed, the applicant will show that a mitigation project site has been secured and appropriate financial assurances in place.

(a) Complete all work necessary to carry out the mitigation plan no later than the first full growing season following the start of project construction, whenever feasible.

(b) If beginning the initial mitigation actions within that time is infeasible, then include other measures that mitigate for the consequences of temporal losses in the mitigation plan.

(6) Actions to complete a mitigation plan that require a Corps permit will also meet all applicable terms and conditions for this Opinion, or complete a separate consultation.

iii. Plan contents. Include all pertinent elements of a site restoration plan, outlined above, and the following elements.

(1) Consideration of the following factors during mitigation site selection and plan development.

(a) Watershed considerations related to specific aquatic resource needs of the affected area.

(b) Existing technology and logistical concerns.

(2) A description of the legal means for protecting mitigation areas, and a copy of any legal instrument relied on to secure that protection.

11. To implement reasonable and prudent measure #11 (maintenance dredging), the Corps shall ensure that:

a. Exclusions.

i. The economic loading method[1] of placing dredged material on a barge as part of a dredging operation is not allowed.

ii. Dredging in the following places is not allowed.

(1) Salmonid spawning habitat in tributaries or upstream of those habitats.

(2) Any channel for a water intake that does not have a fish screen that is installed, operated and maintained according to NOAA Fisheries' fish screen criteria.[2]

(3) The Columbia River, above Bonneville Dam, in backwater sloughs, silted-in lateral channels, alcoves, side channels, or other shallow-water areas less than 20 feet deep, measured from mean lower low water in the Columbia River in areas downstream of Jim
Crow Sands (river mile 27) and in estuarine areas with mean annual salinity greater than 0.5 parts per thousand and measured from ordinary high water in all other areas.

b. Dredge Material Evaluation Framework. Evaluate sediment quality before dredging begins using the most recent version of NOAA Fisheries' approved criteria for evaluation of contaminated sediments.[3] Only sediments approved for in-water disposal using those criteria are authorized for maintenance dredging.

c. Dredge operation. Operate dredges as follows:

i. Keep hydraulic dredge intakes at or just below the surface of the material being removed, although the intake may be raised for brief periods of purging or flushing.

ii. Use clamshell dredges with a finishing type bucket with flaps, whenever feasible.

d. Spoil disposal. Place dredge spoil in an approved upland area where it cannot reenter the water body and that is large enough to allow settling, or an in-water disposal area approved by the Corps.

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[1] 'Economic loading' means pumping dredged material with a high water content into the containment area of a hopper dredge or barge, and allowing highly turbid water to overflow over the holding area so that more consolidated material may be collected in the dredge containment area. This process results in a large turbidity plume from the dredge and is often preferred by the contractor performing the dredging because it saves time and money by increasing loads.

[2] National Marine Fisheries Service, *Juvenile Fish Screen Criteria* (revised February 16, 1995) and *Addendum: Juvenile Fish Screen Criteria for Pump Intakes* (May 9, 1996) (guidelines and criteria for migrant fish passage facilities, and new pump intakes and existing inadequate pump intake screens) (http://www.nwr.noaa.gov/1hydrop/hydroweb/ferc.htm).

[3] See, U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, Oregon Department of Environmental Quality, Washington Department of Ecology, and Washington Department of Natural Resources, *Dredged Material Evaluation Framework: Lower Columbia River Management Area* (DMEF) (November 1998) (procedures to determine sediment quality for dredging activity) (http://www.nwp.usace.army.mil/ec/h/hr/Final/).

12. To implement reasonable and prudent measure #12 (return water from upland disposal sites), the Corps shall ensure that:

a. This only applies to dredging actions permitted under this Opinion.

b. Return flows do not exceed 4 feet per second at either the outfall or diffuser port, the maximum size of any aperture does not exceed one inch, and stream flows are not otherwise altered in a way that significantly impairs spawning, rearing, migration, feeding or other essential behaviors.

c. Return flows will not increases ambient stream turbidity by more than 10% above background 100 feet below the discharge, when measured relative to a control point immediately upstream of the discharge.

13. To implement reasonable and prudent measure #13 (monitoring), the Corps shall:

a. Regulatory program implementation monitoring. Ensure that each applicant submits a monitoring report to the Corps within 120 days of project completion describing the applicant's success meeting his or her permit conditions. Each project level monitoring report will include the following information.

i. Project identification

(1) Applicant name, permit number, and project name.
(2) Type of activity.
(3) Project location, including any compensatory mitigation site(s), by
5th field HUC and by latitude and longitude as determined from the appropriate USGS 7-minute quadrangle map.
(4) Corps contact person.
(5) Starting and ending dates for work completed.

ii. Photo documentation. Photos of habitat conditions at the project and any compensation site(s), before, during, and after project completion.[1]

(1) Include general views and close-ups showing details of the project and project area, including pre and post construction.
(2) Label each photo with date, time, project name, photographer's name, and a comment about the subject.

iii. Other data. Additional project-specific data, as appropriate for individual projects.

(1) Work cessation. Dates work ceased due to high flows, if any.

(2) Fish screen. Evidence of compliance with NOAA Fisheries' fish screen criteria.

(3) Pollution control. A summary of pollution and erosion control inspections, including any erosion control failure, contaminant release, and correction effort.

(4) Drilling. A description of the drilling technology used, required access roads, and methods used to isolate all drilling operations and fluids from flowing water.

[1] Relevant habitat conditions may include characteristics of channels, eroding and stable streambanks in the project area, riparian vegetation, water quality, flows at base, bankfull and over-bankfull stages, and other visually discernable environmental conditions at the project area, and upstream and downstream of the project.

4c

(5) Pilings.

(a) Number and type of pilings removed, including the number of pilings (if any) that broke during removal.

(b) Number, type, and diameter of any pilings installed (*e.g.*, untreated wood, treated wood, hollow steel).

(c) Description of how pilings were installed and any sound attenuation measures used..

(6) Site preparation.

(a) Total cleared area – riparian and upland.
(b) Total new impervious area.

(7) Isolation of in-water work area, capture and release.

(a) Supervisory fish biologist – name and address.
(b) Methods of work area isolation and take minimization.
(c) Stream conditions before, during and within one week after completion of work area isolation.
(d) Means of fish capture.
(e) Number of fish captured by species.
(f) Location and condition of all fish released.
(g) Any incidence of observed injury or mortality of listed species.

(8) Streambank protection.

(a) Type and amount of materials used.
(b) Project size – one bank or two, width and linear feet.

(9) Road construction, repairs and improvements. The justification for any new permanent road crossing design (*i.e.*, road realignment, full span bridge, streambed simulation, or no-slope design culvert).

(10) Water dependent structures and related features.

(a) Area of new over-water structure.
(b) Streambank distance to nearest existing water dependent structure -- upstream and down.

(11) Minor discharge and excavation/maintenance dredging.

(a) Volume of dredged material.
(b) Water depth before dredging and within one week of completion.
(c) Verification of upland dredge disposal.

(12) Site restoration. Photo or other documentation that site restoration performance standards were met.

(13) Long-term habitat loss. The same elements apply as for monitoring site restoration.

iv. Site restoration or compensatory mitigation monitoring. In addition to the 120-day implementation report, each applicant will submit an annual report by December 31 that includes the written record documenting the date of each visit to a restoration site or mitigation site, and the site conditions and any corrective action taken during that visit. Reporting will continue from year to year until the Corps certifies that site restoration or compensatory mitigation performance standards have been met.

Department of State Lands
775 Summer Street NE, Suite 100
Salem, OR 97301-1279
☎ 503-378-3805

Permit No.:	**30897-RP**
Permit Type:	**Removal**
Waterway:	**Willamette River**
County:	**Multnomah**
Expiration Date:	**January 14, 2005**
Corps No.:	**1991-00099**

SCHNITZER STEEL INDUSTRIES, INC.

IS AUTHORIZED IN ACCORDANCE WITH ORS 196.800 TO 196.990 TO PERFORM THE OPERATIONS DESCRIBED IN THE ATTACHED COPY OF THE APPLICATION, SUBJECT TO THE SPECIAL CONDITIONS LISTED ON ATTACHMENT A AND TO THE FOLLOWING GENERAL CONDITIONS:

1. This permit does not authorize trespass on the lands of others. The permit holder shall obtain all necessary access permits or rights-of-way before entering lands owned by another.
2. This permit does not authorize any work that is not in compliance with local zoning or other local, state, or federal regulation pertaining to the operations authorized by this permit. The permit holder is responsible for obtaining the necessary approvals and permits before proceeding under this permit.
3. All work done under this permit must comply with Oregon Administrative Rules, Chapter 340; Standards of Quality for Public Waters of Oregon. Specific water quality provisions for this project are set forth on Attachment A.
4. Violations of the terms and conditions of this permit are subject to administrative and/or legal action which may result in revocation of the permit or damages. The permit holder is responsible for the activities of all contractors or other operators involved in work done at the site or under this permit.
5. A copy of the permit shall be available at the work site whenever operations authorized by the permit are being conducted.
6. Employees of the Department of State Lands and all duly authorized representatives of the Director shall be permitted access to the project area at all reasonable times for the purpose of inspecting work performed under this permit.
7. Any permit holder who objects to the conditions of this permit may request a hearing from the Director, in writing, within 10 days of the date this permit was issued.
8. In issuing this permit, the Department of State Lands makes no representation regarding the quality or adequacy of the permitted project design, materials, construction, or maintenance, except to approve the project's design and materials, as set forth in the permit application, as satisfying the resource protection, scenic, safety, recreation, and public access requirements of ORS Chapters 196, 390 and related administrative rules.
9. Permittee shall defend and hold harmless the State of Oregon, and its officers, agents, and employees from any claim, suit, or action for property damage or personal injury or death arising out of the design, material, construction, or maintenance of the permitted improvements.

NOTICE: If removal is from state-owned submerged and submersible land, the applicant must comply with leasing and royalty provisions of ORS 274.530. If the project involves creation of new lands by filling on state-owned submerged or submersible lands, you must comply with ORS 274.905 - 274.940. This permit does not relieve the permittee of an obligation to secure appropriate leases from the Department of State Lands, to conduct activities on state-owned submerged or submersible lands. Failure to comply with these requirements may result in civil or criminal liability. For more information about these requirements, please contact the Department of State Lands, 378-3805.

Lori Warner, Manager
Western Region Field Operations
Oregon Department of State Lands

Lori Warn
Authorized Signature

January 15, 2004
Date Issued

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ATTACHMENT A

Special Conditions for Removal/Fill Permit No. 30897-RP. PLEASE READ AND BECOME FAMILIAR WITH CONDITIONS OF YOUR PERMIT. This project may be site inspected by the Division of State Lands as part of our monitoring program. The Division has the right to stop or modify the project at any time if you are not in compliance with these conditions. A copy of this permit shall be available at the work site whenever authorized operations are being conducted.

1. This permit authorizes the removal of up to 127,000 cubic yards (total project) of sand and silt at International Terminals, Berths 1, 2 and 3 located at T2N, R1W, Section 35, tax lot 500, at Willamette River, mile 3.8, Portland, Multnomah County for maintenance dredging as outlined in the attached permit application, map and drawings, dated July 9, 2003.

2. No removal activities shall commence within waters of the State without first obtaining any required authorization from the City of Portland for upland disposal. If the local permit(s) results in any modifications in this project relative to this permit, the permit holder shall contact the Division and request adjustments to this authorization.

3. Removal activities in Willamette River, mile 3.8, International Terminal Berths 1, 2 and 3, shall be conducted between July 1 and October 31 (any year with valid permit) and between January 1 and January 31, 2004, unless otherwise coordinated with ODFW and approved in writing by ODSL.

4. The dimensions and depth of the berths shall be no greater than described in Application, Sheets 2 of 3 and 3 of 3. Any alteration of the plan requires Division of State Lands approval.

5. Dredging activity shall be conducted by clamshell bucket from a floating crane and as described in Application. In the closed position, the bucket shall be sealed so as to minimize sediment resuspension. The barge shall be positioned so as to avoid grounding on the river bed or banks at any time.

6. All dredge materials shall be placed in barges equipped such that no material shall discharge to waters of the State during loading, transfer and unloading activity.

7. Any return waters generated during transfer and disposal activity shall be provided adequate settling time so that return waters meet water quality requirements of the Department of Environmental Quality.

8. Dredged materials shall be disposed of in appropriately permitted, upland disposal site(s). The selected disposal facility(ies), and any changes thereafter, shall be submitted to the Division for approval prior to use.

9. Any beneficial reuse of dredged materials is subject to a license from, and royalty payments to, the Division of State Lands.

Water Quality Conditions

10. Dredging activity shall conducted in strict compliance with the DEQ approved Water Quality Management Plan (WQMP) for the site. The approved WQMP and its contents are incorporated into and become a binding condition of this Permit. The Plan outlines: an effects-based turbidity standard; implementation of action level and stop-work level turbidity thresholds; monitoring protocols; and reporting requirements.

11. Petroleum products, chemicals, fresh cement, sandblasted material and chipped paint or other deleterious waste materials shall not be allowed to enter waters of the state. No wood treated with leach able preservatives shall be placed in the waterway. Machinery refueling is to occur off-site or in a confined designated area to prevent spillage into waters of the state. Project-related spills into water of the state or onto land with a potential to enter waters of the state shall be reported to the Oregon Emergency Response System at 800-452-0311.

Contingencies

12. If any archaeological resources and/or artifacts are uncovered during excavation, all construction activity shall immediately cease. The State Historic Preservation Office shall be contacted (phone: 503-378-4168).

13. When listed species are present, the permit holder must comply with the federal Endangered Species Act. If previously unknown listed species are encountered during the project, the permit holder shall contact the appropriate agency as soon as possible.

14. The permittee is responsible for carrying-out the terms and conditions of this permit unless the permit is transferred to another party using forms provided by the Division.

15. The Division of State Lands retains the authority to temporarily halt or modify the project in case of unforeseen damage to natural resources.

Lower Willamette River Management Plan Consistency

The proposed activity at Willamette River, mile 3.8, is located within a designated "Open Water" area of the Lower Willamette River Management Plan (Plan). Maintenance dredging is identified in the Plan as an allowable activity in designated open waters, subject to the following additional conditions.

16. Schedule project development and maintenance to avoid peak public use periods for recreation activities present in the project area.

17. Schedule project development and maintenance to assure, as much as possible, that commercial navigational uses (barge, ship, tug traffic) remain unimpeded.

18. Strictly adhere to all public health, safety, and water quality standards, building and zoning codes required by the appropriate local government agencies, the Oregon Water Resources Department, the Oregon Department of Environmental Quality, and U.S. Environmental Protection Agency. Obtain all necessary permits and comply with all permit conditions.

19. There shall be no significant adverse effect to the riparian and aquatic life and habitat by any activity within shallow water (-15 feet Columbia River datum) or Rank 1 and 2 wildlife habitat areas.

20. The area dredged shall be the minimum necessary to accomplish the intended use and comply with these standards.

21. For access dredging, normal removal shall be sufficient to provide access for a period no less than 24 months.

22. Levels of pollutants released into waters by dredging and disposal shall conform to standards approved by DEQ.

23. Sides of dredged channels and basins should be sloped to facilitate physical stabilization. Slopes shall be no steeper than 3:1.

24. Critical periods of fish and wildlife activity as determined by Oregon Department of Fish and Wildlife (ODFW) (spawning, passage, nesting, etc.) shall be avoided.

25. Dredging will not be allowed from public beach areas.

26. All dredging operations must use disposal sites acceptable to the U.S. Army Corps of Engineers, the Division of State Lands, and local land use regulations.

27. Dredging shall be timed so that equipment stays clear of recreational and commercial navigation users of the river, especially during the recreation use season (March – October).

January 15, 2004

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US Army Corps of Engineers
Portland District

JOINT
PERMIT APPLICATION FORM

THIS APPLICATION WILL MEET THE REQUIREMENTS OF BOTH AGENCIES

AGENCIES WILL ASSIGN NUMBERS

Corps Action ID Number _____ Oregon Division of State Lands Number 30897-RP

SEND ONE SIGNED COPY OF YOUR APPLICATION TO EACH AGENCY

District Engineer
ATTN: CENWP-OP-GP
P.O. Box 2946
Portland, OR 97208-2946
503-808-4373

State of Oregon
Division of State Lands
775 Summer Street N.E.
Salem, OR 97310
503-378-3805

RECEIVED
JUL 09 2003
DIVISION OF STATE LANDS

1. APPLICANT NAME: Schnitzer Steel Industries, Inc.
Address: PO Box 10047
Portland, OR 97296-0047
Attn: Jim Jakubiak

Business Phone #: (503) 224-9900
Home Phone #: N/A
FAX #: (503) 286-6948

[ ] Co-Applicant [x] Authorized Agent [ ] Contractor

Name: Jerald Ramsden
Address: Parsons Brinckerhoff Quade & Douglas, Inc.
400 SW 6th Ave., Suite 802
Portland, OR 97204

Business Phone #: (503) 274-8772
Home Phone #: N/A
FAX #: (503) 274-1412

Property Owner *(if different than applicant)*
Name: Schnitzer Investment Corporation
Address: P.O. Box 10047
Portland, OR 97296-0047

Business Phone #: (503) 224-9900
Home Phone #: N/A
FAX #: N/A

2. PROJECT LOCATION

Street, road or other descriptive location: International Terminals, 12005 N. Burgard Rd.

Legal Description

Quarter	Section	Township	Range
SW	35	[2] North [ ] South	[ ] East [1] West

In or Near (City or Town) Portland County Multnomah Tax Map # 2N1W35 Tax Lot # 500
Waterway Willamette River River Mile 3.6 Latitude 45° 36' 41" N Longitude 122° 45' 42" W

Is consent to enter property granted to the Corps and the Division of State Lands? [x] Yes [ ] No

3. PROPOSED PROJECT INFORMATION

Activity Type: [ ] Fill [x] Excavation (removal) [ ] In-Water Structure [ ] Maintain/Repair an Existing Structure

Brief Description: Maintenance dredging to provide safe navigation access to and berthing within the International Terminals slip (Berths 1, 2 and 3)

Fill will involve N/A cubic yards annually and/or _____ cubic yards for the total project
_____ cubic yards in a wetland or below the ordinary high water or high tide line

Fill will be: [ ] Riprap [ ] Rock [ ] Gravel [ ] Sand [ ] Silt [ ] Clay [ ] Organics [ ] Other _____

Fill Impact Area is _____ Acres; _____ length; _____ width; _____ depth

Removal will involve 25,000 every other year on average cubic yards annually and/or 127,000 (i.e. 77,000 initially and 50,000 thereafter) cubic yards for the total project
127,000 cubic yards below the ordinary high water or high tide line

SCHN00157990

Removal will be: [ ] Riprap [ ] Rock [ ] Gravel [x] Sand [x] Silt [ ] Clay [ ] Organics [ ] Other ____

Removal Impact Area is	9.6 first year, 6.0 thereafter Acres;	2250 ft length;	120 ft typical (270 ft max.) width;	Varies: max between -42 ft CRD and -24 ft CRD depth

Is the Disposal area: Upland? [x] Yes [ ] No Wetland/Waterway? [ ] Yes [x] No

	Yes	No
Are you aware of any Endangered Species on the project site?	x	
Are you aware of any Cultural Resources on the project site?		x
Is the project site near a Wild and Scenic River?		x

If Yes, please explain in the project description (on page 2, block 4).

4. PROPOSED PROJECT PURPOSE AND DESCRIPTION

Project Purpose and Need: Presented in attached supplemental sheets.

Project Description: Presented in attached supplemental sheets.

How many project drawing sheets are included with this application? 3

NOTE: A complete application must include drawings and a location map submitted on separate 8-1/2 x 11 sheets.

Will any material, construction debris, runoff, etc. enter a wetland or waterway? ☐ Yes ☒ No

If yes, describe the type of discharge (above) and show the discharge location on the site plan.

Estimated Start Date August 15, 2003 Estimated Completion Date August 14, 2008

5. PROJECT IMPACTS AND ALTERNATIVES

Describe alternative sites and project designs that were considered to avoid impacts to the waterway or wetland.

Presented in attached supplemental sheets.

Describe what measures you will use (before and after construction) to minimize impacts to the waterway or wetland.

Presented in attached supplemental sheets.

NOTE: If necessary, use additional sheets.

6. ADDITIONAL INFORMATION

Adjoining Property Owners and Their Addresses and Phone Numbers.

Port of Portland
121 NW Everett
Portland, OR 97209
(503) 944-7000

Northwest Terminal Company
P.O. Box 99007
Seattle, WA 98199-0007

Has the proposed activity or any related activity received the attention of the Corps of Engineers or the State of Oregon in the past, e.g., wetland delineation, violation, permit, lease request, etc.? ☒ Yes ☐ No

If yes, what identification number(s) were assigned by the respective agencies?

Corps # 199100099 State of Oregon# 1055

SCHN00157992

7. **CITY/COUNTY PLANNING DEPARTMENT AFFIDAVIT** (to be completed by local planning official)

☐ This project is not regulated by the local comprehensive plan and zoning ordinance.

☒ This project has been reviewed and is consistent with the local comprehensive plan and zoning ordinance. (Not approving upland disposal site)

☐ This project has been reviewed and is **not** consistent with the local comprehensive plan and zoning ordinance.

☐ Consistency of this project with the local planning ordinance cannot be determined until the following local approval(s) are obtained:

- ☐ Conditional Use Approval
- ☐ Development Permit
- ☐ Plan Amendment
- ☐ Zone Change
- ☐ Other _____

An application ☐ has ☐ has not been made for local approvals checked above.

Signature (of local planning official)	Title	City/County	Date
Mark Fright	City Planner	Portland	6/27/03

8. **COASTAL ZONE CERTIFICATION**

If the proposed activity described in your permit application is within the Oregon coastal zone, the following certification is required before your application can be processed. A public notice will be issued with the certification statement which will be forwarded to the Oregon Department of Land Conservation and Development (DLCD) for its concurrence or objection. For additional information on the Oregon Coastal Zone Management Program, contact the department at 1175 Court Street N.E., Salem, Oregon 97310 or call 503-373-0050.

Certification Statement

I certify that, to the best of my knowledge and belief, the proposed activity described in this application complies with the approved Oregon Coastal Zone Management Program and will be completed in a manner consistent with the program.

Print/Type Name	Title
Applicant Signature	Date

9. **SIGNATURE FOR JOINT APPLICATION (REQUIRED)**

Application is hereby made for the activities described herein. I certify that I am familiar with the information contained in the application, and, to the best of my knowledge and belief, this information is true, complete, and accurate. I further certify that I possess the authority including the necessary requisite property interests to undertake the proposed activities. I understand that the granting of other permits by local, county, state or federal agencies does not release me from the requirements of obtaining the permits requested before commencing the project. I understand that local permits may be required before the state removal-fill permit is issued. I understand that payment of the required state processing fee does not guarantee permit issuance.

Print/Type Name (applicant)	Title
James L. Jakubick	Environmental Administrator
Applicant Signature (applicant)	Date
	June 27, 2003

I certify that I may act as the duly authorized agent of the applicant.

Print/Type Name	Title
Jerald D. Ramsden	Lead Coastal Engineer
Authorized Agent Signature)	Date
	June 27, 2003

SUPPLEMENTAL WETLAND IMPACT INFORMATION*
(FOR WETLAND FILLS ONLY)

Site Conditions of impact area

Impact area is: [ ] Ocean [ ] Estuary [X] River [ ] Lake [ ] Stream [ ] Freshwater Wetland

Note: Estuarian Resource Replacement is required by state law for projects involving intertidal or tidal marsh alterations. A separate Wetlands Resource Compensation Plan may be appended to the application.

Has a wetland delineation been completed for this site? [ ] Yes [X] No

If yes, by whom:

Describe the existing physical and biological character of the wetland/waterway site by area and type of resource (use separate sheets and photos, if necessary).

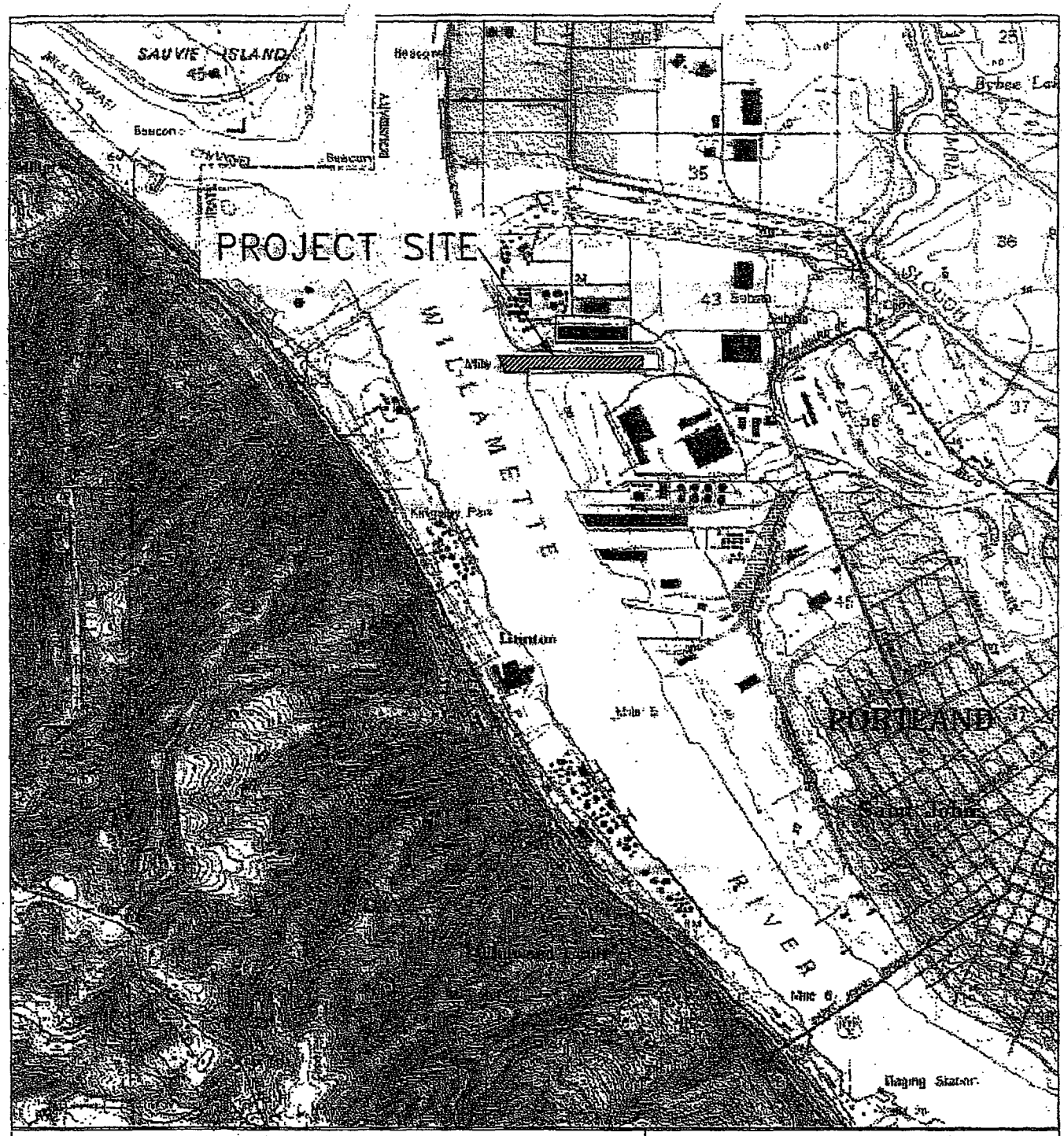
Presented in the attached Biological Assessment

Resource Replacement Mitigation

Describe measures to be taken to replace unavoidably impacted wetland resources.

No wetland resources are affected by the proposed work. Therefore, no mitigation is proposed.

* Because this information is not necessary for a complete application, you may submit this sheet and other environmental information after submitting your application.



NOTE 1. LOCATION MAP OBTAINED FROM US GEOLOGICAL SURVEY QUAD SHEET FOR LINNTON, OR

Scale In Feet
0 1000 2000

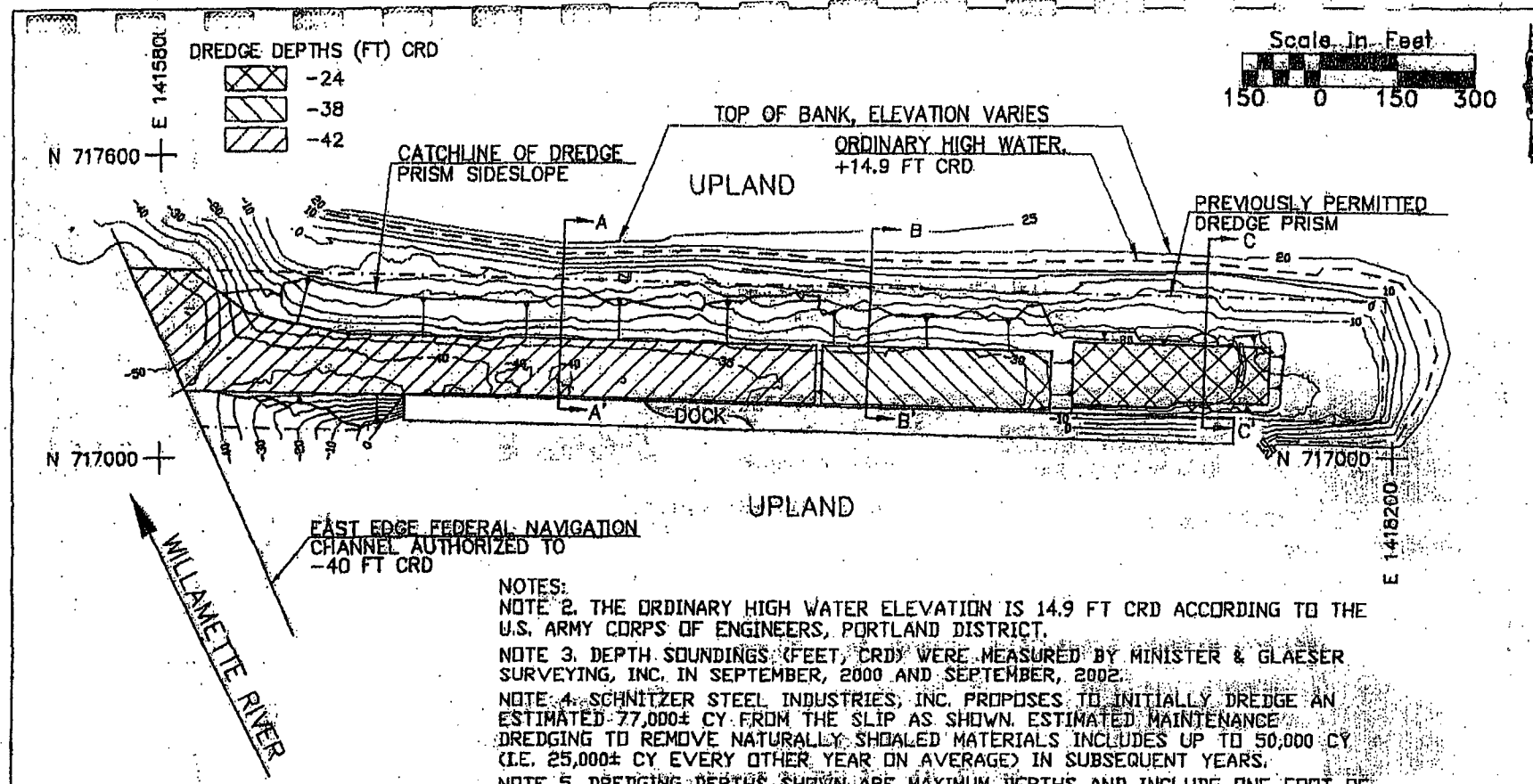
PURPOSE: MAINTAIN NAVIGATION ACCESS AND BERTHS FOR SHIPS AND BARGES
VERTICAL DATUM: COLUMBIA RIVER DATUM (CRD). CRD IS 1.6' ABOVE NGVD AT WILLAMETTE RIVER MILE 3.6
ADJACENT PROPERTY OWNERS:
1. NORTHWEST TERMINAL COMPANY
2. PORT OF PORTLAND

LATITUDE: 45° 36' 41" N
LONGITUDE: 122° 46' 42" W

PROPOSED MAINTENANCE DREDGING AT INTERNATIONAL TERMINALS

IN: WILLAMETTE RIVER
AT: RIVER MILE 3.6
COUNTY OF: MULTNOMAH
APPLICATION BY: SCHNITZER STEEL INDUSTRIES, INC.
SHEET 1 OF 3 DATE: 5/29/03

SCHN00157995



NOTES:

NOTE 2. THE ORDINARY HIGH WATER ELEVATION IS 14.9 FT CRD ACCORDING TO THE U.S. ARMY CORPS OF ENGINEERS, PORTLAND DISTRICT.

NOTE 3. DEPTH SOUNDINGS (FEET, CRD) WERE MEASURED BY MINISTER & GLAESER SURVEYING, INC. IN SEPTEMBER, 2000 AND SEPTEMBER, 2002.

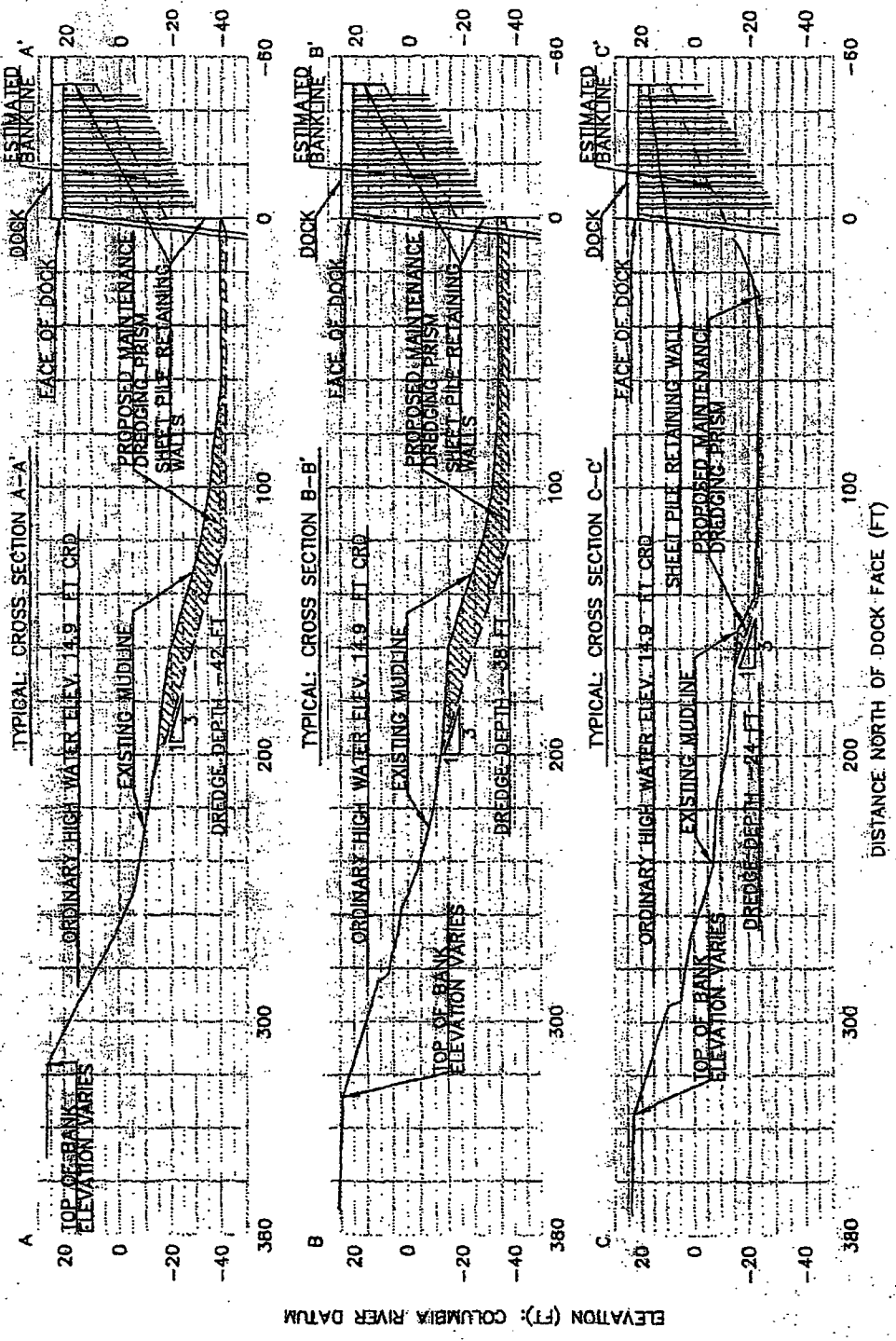
NOTE 4. SCHNITZER STEEL INDUSTRIES, INC. PROPOSES TO INITIALLY DREDGE AN ESTIMATED 77,000± CY FROM THE SLIP AS SHOWN. ESTIMATED MAINTENANCE DREDGING TO REMOVE NATURALLY SHOALED MATERIALS INCLUDES UP TO 50,000 CY (I.E. 25,000± CY EVERY OTHER YEAR ON AVERAGE) IN SUBSEQUENT YEARS.

NOTE 5. DREDGING DEPTHS SHOWN ARE MAXIMUM DEPTHS AND INCLUDE ONE FOOT OF ADVANCED MAINTENANCE AND ONE FOOT OF ALLOWABLE OVERDEPTH DUE TO DREDGING INACCURACY.

NOTE 6. SCHNITZER STEEL INDUSTRIES, INC. PROPOSES TO DREDGE THE MATERIAL USING A CLAMSHELL BUCKET OPERATED FROM A FLOATING CRANE. DREDGED MATERIAL WILL BE PLACED IN APPROVED UPLAND LOCATIONS.

	PURPOSE: MAINTAIN NAVIGATION ACCESS AND BERTHS FOR SHIPS AND BARGES VERTICAL DATUM: COLUMBIA RIVER DATUM (CRD). CRD IS 1.6' ABOVE NGVD AT WILLAMETTE RIVER MILE 3.6 ADJACENT PROPERTY OWNERS: 1. NORTHWEST TERMINAL COMPANY 2. PORT OF PORTLAND	LATITUDE: 45° 36' 41" N LONGITUDE: 122° 46' 42" W HORIZONTAL DATUM: OREGON STATE PLANE COORDINATE SYSTEM, NORTH ZONE (NAD-27), U.S. SURVEY FEET	PROPOSED MAINTENANCE DREDGING AT INTERNATIONAL TERMINALS IN: WILLAMETTE RIVER AT: RIVER MILE 3.6 COUNTY OF: MULTNOMAH APPLICATION BY: SCHNITZER STEEL INDUSTRIES, INC. SHEET 2 OF 3 DATE: 5/29/03

SCHN0015996



PURPOSE: MAINTAIN NAVIGATION ACCESS AND BERTHS FOR SHIPS AND BARGES VERTICAL DATUM: COLUMBIA RIVER DATUM (CRD), CRD IS 1.6' ABOVE NGVD AT WILLAMETTE RIVER MILE 3.6 ADJACENT PROPERTY OWNERS: 1. NORTHWEST TERMINAL COMPANY 2. PORT OF PORTLAND	LATITUDE: 45° 36' 41" N LONGITUDE: 122° 46' 42" W SCALE: AS SHOWN	PROPOSED MAINTENANCE DREDGING AT INTERNATIONAL TERMINALS IN: WILLAMETTE RIVER AT: RIVER MILE 3.6 COUNTY OF: MULTNOMAH APPLICATION BY: SCHNITZER STEEL INDUSTRIES, INC. SHEET 3 OF 3 DATE: 5/29/03

SUPPLEMENTAL DATA

Joint Application for Maintenance Dredging
International Terminals Slip (Berths 1, 2 and 3), Portland, Oregon

4. PROPOSED PROJECT PURPOSE AND DESCRIPTION

Project Purpose and Need

The project purpose is to maintain safe navigation access and berthing for the dock facilities at the International Terminals slip (as shown in Sketch 1 of 3, attached) by conducting periodic maintenance dredging as needed. The slip and associated berths are an existing facility and have been maintained under previous maintenance dredging permits (U.S. Army Corps of Engineers Section 10/404 Permit #199100099 and Oregon Division of State Lands Removal-Fill Permit No. 1055).

The docks and berths at the International Terminals slip currently support metal recycling operations as well as barge and ship dismantling operations. The facility is also used to import bulk cargo such as manganese, pig iron, steel coils and steel slabs. The slip contains three berths and 1,680 feet of docking facilities. The site was originally developed in the early 1940's for military ship construction. Over the past three decades, the site has been primarily used to support metal recycling and vessel dismantling operations.

Due to shoaling at the mouth of the slip and within the berths, there is a critical and urgent need to maintain these facilities. In the fall of 2002 an incoming ship was required to dock and offload several thousand tons of cargo prior to arrival at the International Terminals slip. Subsequent to that event, a meeting was held with the Columbia River Pilots (Pilots) to determine the minimum acceptable conditions needed for safe navigation access and berthing in the slip given the draft, length and width of vessels that will use this facility over the next five years. A letter summarizing the Pilots' suggestions from these meetings is attached to this application. The proposed dredge prism shown in the attached sketches was developed based on the suggestions from the Pilots in addition to other engineering considerations such as slope stability.

Project Description

The project involves dredging the area to a maximum depth of –42 ft Columbia River Datum (CRD), -38 ft CRD or –24 ft CRD depending on location within the slip as shown in Sketches 2 and 3 of 3, attached. The proposed dredge footprint covers an area of approximately 9.6 acres with a maximum length of 2250 ft and maximum width of 270 ft. The proposed dredge footprint lies entirely within the previously permitted dredge area shown in Sketch 2 of 3 by the dashed-dot line. The initial dredge volume associated with the proposed dredge prism is 77,000 cy. Authorization for an additional 50,000 cy is requested for the remainder of the permit duration (i.e. 25,000 cy every other year on average in years two through five, based on a five year permit). Dredging will be by clamshell bucket with transport to approved upland facilities and/or locations by barge, truck and/or rail.

Recent sediment sampling results are attached to this application and have been utilized in development of the Biological Assessment.

5. PROJECT IMPACTS AND ALTERNATIVES

Describe alternative sites and project designs that were considered to avoid impacts to the waterway or wetland.

No alternatives were considered for maintenance dredging in the existing entrance channel and berths since this slip is an existing and previously permitted facility. As outlined in the attached letter from the Pilots, the proposed dredge prism is the minimum needed to provide safe navigation access and berthing. The proposed dredge prism covers less area than authorized in previous permits. The site is designated for marine industrial use by the Lower Willamette River Management Plan, which recognizes the important need to protect and fully utilize the limited areas of Portland Harbor so designated.

Describe what measures you will use (before and after construction) to minimize impacts to the waterway or wetland.

Construction will be conducted during an allowable fish-related inwater work period, although the emergency need and permitting time frame may require extension of the regularly scheduled Oct. 31 and/or Jan. 31 closure to allow completion of the project. Best management practices will be utilized during maintenance dredging as outlined in the Programmatic Biological Opinion (National Marine Fisheries Service dated June 14, 2002 that covers maintenance dredging of existing port terminals) and the Corps of Engineers Nationwide Permit (that includes maintenance dredging) to protect water quality and benthic resources. The proposed dredging will provide one foot of advanced maintenance (already accounted for in the maximum proposed dredge depths) to reduce to the extent practicable the frequency of maintenance dredging events.

COLUMBIA RIVER PILOTS
13225 N. LOMBARD
PORTLAND, OREGON 97203
503-289-9922
FAX 503-289-9955

PARSONS BRINCKERHOFF

MAR 06 2003

5582

January 8, 2003

Jerald D. Ramsden
PB Ports & Marine
400 SW 6th Ave., Suite 802
Portland OR 97204

Dear Jerry,

A few weeks ago we met to discuss navigation safety for vessel operations as it relates to maintenance dredging at the International Terminals slip. To recap our thoughts on the subject:

> The berth should be maintained to a minimum depth of forty (40) feet (at zero gauge) for a distance of eight hundred (800) feet long and one hundred twenty to one hundred forty (140) feet wide.
>
> There are some pilings in the Willamette River just off the upstream corner of the slip. We suggest the project owner consider removal of these piling which would make it possible for tugs to maneuver in this area when assisting a ship into or out of the berth.
>
> Ideally a ship entering the dock from downstream should be able to approach the dock from an oblique angle, cutting across the downstream entrance to the slip. The entrance to the berth (the area between the start of the berth and the Willamette River) should be dredged to allow this. A vessel attempting to enter the berth should not have to position itself perpendicular to the river and in a straight line with the berth in order to enter the berth.

If you have any questions do not hesitate to call me at 503-289-9924.

Very truly yours,

Lonny Rodgers

Capt. Lonny Rodgers
Treasurer

\\Server3\Manager\COLRIP\PILOTING\T\dock_1.doc

INTERNATIONAL TERMINALS (BERTHS 1, 2, AND 3)
MAINTENANCE DREDGING
BIOLOGICAL ASSESSMENT
Portland, Oregon

Prepared for

Parsons Brinckerhoff

400 SW Sixth Street, Suite 802

Portland, OR 97204

Prepared by

MCS Environmental, Inc.

6505 – 216th Street SW, Suite 100

Mountlake Terrace, WA 98043

July 8, 2003

34088-001

CONTENTS

CONTENTS (continued)

CONTENTS (continued)

APPENDICES

LIST OF TABLES

LIST OF FIGURES

International Terminals (Berths 1, 2, and 3) Maintenance Dredging

1.0 INTRODUCTION

Section 7 of the Endangered Species Act (ESA) requires that actions of federal agencies to ensure that any action carried out by the agency is "not likely to jeopardize the continued existence of any [listed] species or result in the destruction or adverse modification of habitat of such species...." Issuance of a federal permit is an agency action pursuant to Section 7. falls under this requirement.

Schnitzer Steel Industries, Inc. (SSI) is applying for a permit from the US Army Corps of Engineers (Corps) to conduct maintenance dredging of Berths 1, 2, and 3 of the International Terminals slip. This requires a Section 10/404 permit from the Corps, which qualifies as an action by a federal agency for purposes of and therefore must comply with Section 7 of the ESA. Pursuant to Section 7, the Corps is required to produce a biological evaluation (BE) of the potential effect of issuing the permit on listed species or their critical habitat. To help the Corps evaluate the potential effects of the proposed project on listed species, MCS Environmental, Inc. (MCS) has prepared this Biological Assessment (BA) on the behalf of SSI.

To determine if listed species or their critical habitat are in the vicinity of the proposed project, MCS consulted the National Marine Fisheries Service (NMFS), Northwest Region <http://www.nwr.noaa.gov/esalist.htm> and sent a written request to the US Fish and Wildlife Service (USFWS). Based on information from the NMFS Website and a response from USFWS (McMaster, K., USFWS, pers. com., June 12, 2003; Appendix A), the following listed species may occur in the project area and are therefore addressed in this BE:

- Lower Columbia River chinook salmon (*Oncorhynchus tshawytscha*), listed as threatened in 1999.
- Upper Willamette River chinook salmon (*O. tshawytscha*), listed as threatened in 1999.
- Columbia River run chum salmon (*O. keta*), listed as threatened in 1999.
- Lower Columbia River steelhead trout (*O. mykiss*), listed as threatened in 1998.
- Upper Willamette River steelhead trout (*O. mykiss*), listed as threatened in 1999.
- Bald eagle (*Haliaeetus leucocephalus*), listed as threatened in 1978.
- Water howellia (*Howellia aquatilis*), listed as threatened in 1994.

This BA also addresses southwestern Washington–Columbia River coastal cutthroat trout (*O. clarki clarki*), a species proposed for listing and Lower Columbia River–Southwest Washington coho salmon (*O. kisutch*), a candidate for listing. Should cutthroat trout or coho salmon become listed during the life of the proposed project, this BA could be used to aid the Corps during any subsequent Section 7 consultation with NMFS related to these species.

Golden paintbrush (*Castilleja levisecta*), Willamette daisy (*Erigeron decumbens* var. *decumbens*), Bradshaw's lomatium (*Lomatium bradshawii*), Kincaid's lupine (*Lupinus sulphureus* var. *kincaidii*), and Nelson's checker-mallow (*Sidalcea nelsoniana*) are species listed as threatened or endangered but are not addressed in this BA because the habitats required by these species are not within the action area (Federal Register Vol. 58, No. 28; Vol. 62, No. 112; and Vol. 65, No. 16).

2.0 PROJECT DESCRIPTION

2.1 PROJECT AND ACTION AREAS

The "project area" is defined as Berths 1, 2, and 3 of International Terminals slip on the Willamette River at Section 35, Township 2N, Range 1W (Figure 1). Photographs of the project area are in Appendix B.

The "action area" for fish resources is defined as the International Terminals slip, from the head of the slip to its mouth. The "action area" for avian species is defined as a one-mile radius around the project area.

2.2 PROPOSED ACTION DESCRIPTION

SSI proposes to conduct maintenance dredging of Berths 1, 2, and 3 at the International Terminals slip to maintain safe navigation access and berthing for the dock facilities by conducting periodic maintenance dredging as needed. The slip and associated berths have been maintained under previous maintenance dredging permits (US Army Corps of Engineers Section 10/404 Permit #199100099 and Oregon Division of State Lands Removal-Fill Permit No. 1055). The site is designated for marine industrial use by the Lower Willamette River Management Plan, which recognizes the need to protect and fully use the limited areas of Portland Harbor so designated. Over the past three decades, the site has been primarily used to support metal recycling and vessel dismantling operations.

Shoaling at the mouth of the slip and within the berths has created a critical and urgent need to maintain these facilities. In the fall of 2002 an incoming ship was required to dock and offload several thousand tons of cargo before docking at the International Terminals slip. Afterwards, a meeting was held with the Columbia River Pilots (Pilots) to determine the minimum acceptable

conditions needed for safe navigation access and berthing in the slip, given the draft, length and width of vessels that will use this facility over the next five years. The proposed dredge prism is based on suggestions from the Pilots (Appendix C) and engineering considerations such as slope stability (Figures 2 and 3).

The project involves dredging the area to a maximum depth of –42 feet Columbia River Datum (CRD), -38 feet CRD, or –24 feet CRD depending on location within the slip (Figures 2 and 3). The proposed dredge footprint covers about 9.6 acres with a maximum length of 2,250 feet and maximum width of 270 feet. The proposed dredge footprint lies entirely within the previously permitted dredge area and covers less area than authorized in previous permits. The initial dredge volume associated with the proposed dredge prism is 77,000 cubic yards (cy). Over the remainder of the permit duration SSI proposes to dredge another 50,000 cy as needed for ongoing maintenance (e.g. 25,000 cy every other year on average in years two through five as shown in Table 1). Dredging will be by clamshell bucket, with transport to approved upland facilities or locations by barge, truck or rail. Factors such as bucket impact, penetration, withdrawal, and dewatering have been identified as contributing to the resuspension of sediment during clamshell dredge operation (e.g., Hayes et al. 1988). Most of the dewatering will occur as the clamshell excavates and transfers the individual load, which occurs with all dredging operations. The material will have high water content, and some release is expected. The rate at which suspended sediments settle back to the bottom is generally exponential with rapid declines within 200 to 400 feet (Collins 1995). Because of this rapid resettlement, it is anticipated that the area experiencing higher turbidity levels would be relatively small.

The proposed action (i.e. maintenance dredging of an existing facility using a clamshell bucket) and site conditions (see Section 3.0) are consistent with the conditions specified in the *Programmatic Biological Assessment for Categories of Activities Requiring Department of the Army Permits* (Corps 2000b) and NMFS biological opinion of the programmatic BA (NMFS 2002).

2.3 CONSERVATION MEASURES

Construction would occur during times when chinook and chum salmon and steelhead trout are least likely to be present in the action area. All in-water work is scheduled for the in-water work window for the Willamette River (from July 1 through October 1 and December 1 through January 31). However, the urgency of the initial dredge and the permitting time frame may require some work during the regularly scheduled closure to allow completion of the initial dredge. Some construction may occur during the bald-eagle wintering season (October 31 – February 31).

In addition to timing in-water work to avoid the juvenile migration period, SSI proposes to use best management practices during maintenance dredging as outlined in NMFS (2002) and the Corps Nationwide Permit for maintenance dredging to protect water quality and benthic resources. The

proposed dredging will provide one foot of advanced maintenance (already accounted for in the maximum proposed dredge depths) to minimize maintenance dredging events.

3.0 EXISTING ENVIRONMENTAL CONDITIONS AND EFFECTS OF THE ACTION

This section discusses existing environmental conditions and any temporary and permanent effects of project activities (Section 2.2), as well as the net effects of those activities (Table 2). It discusses only those environmental attributes and associated components of habitat quality that are important to the listed species addressed, and that are likely to be affected by the project in some way.

3.1 GENERAL

3.1.1 Existing Conditions

Approximately half of the Lower Willamette River flows through forested areas, one third through agricultural areas, and five percent through urban areas, such as Portland. The International Terminals slip is located at river mile (RM) 3.5 in Portland. Land use surrounding the site is primarily industrial, and riverbanks have been heavily modified with riprap or bulkheads. Berths 1 through 3 are located in the International Terminals slip adjacent to the Burgard Yard. The docks and berths at the slip currently support metal recycling and barge and ship dismantling. The site was originally developed in the early 1940's for military ship construction. These berths are also used to import bulk cargo such as manganese, pig iron, steel coils, and steel slabs. The slip contains three berths and 1,680 feet of docks.

3.1.2 Effects of the Action

The proposed project will not result in increased boat traffic or associated noise.

A clamshell dredge will be used for the proposed project. Increased noise from dredging may cause salmonids, other fish species, and bald eagles to avoid the area during construction. Clamshell buckets are not expected to entrain juvenile, sub–adult, or adult salmonids, but may entrain demersal fish and epibenthic invertebrates.

Results of studies on the effects of waterborne sound on fish behavior have been ambiguous and do not allow for prediction of responses (Popper and Carlson 1998). The level at which fish can detect sound depends upon the level of background noise. Sound must be at least 10 dB more intense than background noise to avoid being masked by ambient noise at the same or nearby frequencies (Tavolga 1971). Popper and Carlson (1998) note that the effects of noise depend greatly on the flow field in which the noise occurs. The level of ambient or background noise can drastically reduce a fish's ability to detect other sounds. Wind and precipitation at the surface, water turbulence, animal sounds, human activity and many other factors create significant levels of underwater noise (ICES 1994, Richardson et al. 1995, and H. Cleator, pers. com. as cited in Stewart 2001). Since most

background noise is within the hearing range of fishes, the noise generated by background conditions and river flows adjacent to the project area will probably modify the reaction of fish to noise generated by the project

Above-water noise and movement of machinery at the site are much more likely to frighten away fish predators such as kingfishers, herons, grebes, and mergansers, than in–water noise is to frighten fish into areas where they might be more vulnerable to predators such as native char, cutthroat trout, and juvenile coho salmon.

The proposed maintenance dredging will allow present operations to continue, and noise generated will not differ much from existing operations at this site and many other sites along the Willamette River. Because the primary noise sources will be about 50 feet from shore, smaller juvenile salmonids moving along the shoreline would likely remain nearshore, rather than moving offshore toward the noise. Fish traveling downstream in the channel would avoid moving barges and tugs by moving away from the vessel path and diving deeper. Because of expected low densities of potential fish predators on juvenile salmonids in mid–channel, this short-term avoidance behavior is unlikely to result in increased predation losses.

3.2 WATER QUALITY AND STORMWATER

3.2.1 Existing Conditions

Urbanization has reduced water quality in the area via direct inputs of municipal and industrial discharges and indirect inputs from agricultural, silvicultural, urban, and industrial land. The Willamette River is currently on the 1998 Oregon Department of Environmental Quality (ODEQ) 303d list as impaired for temperature, bacteria, biological criteria, and toxics. However, ODEQ has been monitoring water quality in the Lower Willamette basin since 1986 with special intensive studies in the Tualatin and Lower Willamette subbasins in 1986-1990. These studies show that water quality in the Lower Willamette Basin has improved significantly (Cude 2003).

3.2.2 Effects of the Action

Because the proposed maintenance dredging will not increase impervious surfaces, stormwater runoff will not increase. The proposed maintenance dredging will not increase boat traffic, so the chance of water quality degradation from pollution from boats will not increase.

The proposed maintenance dredging will cause temporary and localized impacts on water quality in the vicinity of active dredging. Turbidity will increase slightly in a limited mixing zone downstream of active work areas. Elevated turbidity plumes that may occur in localized areas near active dredging should be dissipated relatively rapidly by tidal and river currents (e.g., FSI et al. 1999). In–

water work will be conducted during periods when few if any juvenile anadromous fish will be present.

Juvenile salmon have been shown to avoid areas of high turbidities (e.g., Servizi 1988), although they may seek out areas of moderate turbidity (10 to 80 nephelometric turbidity units [NTU]), presumably as cover against predation (Cyrus and Blaber 1987a, 1987b). Feeding efficiency of juveniles is also impaired by turbidities over 70 NTU, well below sub-lethal stress levels (Bisson and Bilby 1982). Reduced preference by adult salmon homing to spawning areas has been demonstrated where turbidities exceed 30 NTU (20 mg/L suspended sediments). However, chinook salmon exposed to 650 mg/L of suspended volcanic ash were still able to find their natal water (Whitman et al. 1982). Based on these data, it is unlikely that the locally elevated turbidities generated by the proposed action would directly affect juvenile or adult salmonids that may be present.

Short-term effects from increased turbidity are expected during dredging, but these effects from sediment resuspension should be only temporary. Dredging is not expected to result in any long-term adverse changes in levels of chemical contamination, temperature, or dissolved oxygen. Therefore, the net effects of dredging will be to maintain water quality in the project area.

3.3 FLOW AND CURRENT PATTERNS

3.3.1 Existing Conditions

Flows in the Willamette River are controlled by 13 impoundments on several of its larger tributaries and by the Willamette Falls at RM 26.5. Below the falls, the Willamette River is tidally influenced by the Pacific Ocean a hundred miles to the west as well as flow conditions in the Columbia River (Corps 2000a). The width of the Willamette River at the project site is approximately 1,700 feet wide during typical river flows with maximum depths of approximately –50 feet CRD in the vicinity of the International Terminals slip.

3.3.2 Effects of the Action

The proposed maintenance dredging is not expected to alter flow or current patterns of the river since most of the dredging is located within the slip and proposed changes in the bathymetry near the slip mouth are minor in relation to the cross sectional area of the river at this location.

3.4 SEDIMENTS, SUBSTRATE, AND BATHEMETRY

3.4.1 Existing Conditions

Currently the depth of the project area ranges from –10 to –40 feet CRD. Dredging will remove 77,000 cy of sediment in the first year of the permit, followed by an additional 25,000 cy every other year on average during the remainder of the permit duration. The sediments exposed by dredging are expected to be similar to surficial sediments present throughout the project area.

MCS collected five sediment cores in the slip during March 2003 and Floyd Snider McCarthy, Inc. evaluated them using the analyte list suggested in the Dredged Material Evaluation Framework (DMEF) (Corps 1998). Data were compared to the DMEF values, probable effects concentration (PEC) values for freshwater sediment quality developed by MacDonald et al. (2000) and Ingersoll et al. (2000), and Portland Harbor Area-Wide Sediment baseline values (ODEQ 1999).

Only one surface sample exceeded DMEF screening levels. Samples considered representative of the post-dredge surface contained few detectable chemical constuents. When detectable concentrations of chemicals occurred, they were substantially less than screening levels. No samples exceed the PEC values, and all exceedances are within the Portland Harbor Area-Wide Sediment baseline values (FSMI 2003).

3.4.2 Effects of the Action

Maintenance dredging in the project area should maintain sediment quality. Dredging will not affect sedimentation sources or rates. Because most of the sediments in the slip do not contain contaminants above DMEF screening levels, as shown by the recent sampling, resuspension of sediments is not expected to release contaminants into the water column.

Shallow water habitat (< 20 feet in water depth) provides food resources and migration routes for juvenile salmonids (Simenstad et al. 1999). Salmonid habitat may suffer a minor net decline in function due to the deepening. The proposed dredging will create steeper slopes along the edge of the dredge area and deepen the dredge area. However, 79% percent of the initial dredge prism lies below an existing mudline elevation of –20 feet CRD. In subsequent years of the permit it is expected that almost all the dredging will occur below existing mudline elevations of –20 feet CRD. Other than approximately 2.0 acres of dredging area in the first year of the permit all the remainder of the proposed dredging is expected to be at depths below –20 feet CRD (i.e. the lower limit of shallow water habitat). The contribution of epibenthic prey to salmonids from the area to be dredged should be limited by the depths within the proposed dredge prism. The adjacent Willamette River channel and associated shallow-water areas are much larger than the area being dredged, so no adverse impact is anticipated on salmonids foraging on benthic invertebrates in the spring following

dredging. By the spring outmigration period after dredging, the productivity of epibenthic prey for juvenile salmonids should be recovering, but may be less than the ultimate production of the area after a 1- to 2-year recolonization period. Because of the limited area of dredging in depths preferred by foraging salmonids and the rapid recolonization of benthic and epibenthic biota, the proposed dredging is not expected to have any short- or long-term direct effects on the juvenile salmonid foraging habitat.

No known spawning habitat exists within the action area, therefore any potential temporary suspension of sediments is not expected to embed spawning gravels.

3.5 SHORELINE CONDITIONS

3.5.1 Existing Conditions

Historically the Willamette Falls was an impassible fish barrier to many salmonids until fish ladders were constructed in the early 1900s. The International Terminals slip does not hinder fish access in the Willamette River. Few refuge areas, such as off-channel areas, backwater areas, or sloughs, remain in the Willamette River. The International Terminals slip functions somewhat like a slough and could provide refuge for salmonids during periods of high flow in the river, although no studies have documented this.

Riparian vegetation has been greatly altered in the Lower Willamette River Basin. Little to no riparian vegetation exists in the action area along the eastern shore of the Willamette River or in the International Terminals slip. However, riparian vegetation covers a large area along the western shore of the Willamette across from the slip at Forest Park. Black cottonwood (*Populus balsamifera* ssp. *trichocarpa*), Oregon white ash (*Fraxinus latifolia*), red alder (*Alnus rubra*), and willow (*Salix* spp.) are typical trees species along the Willamette River. Typical shrub species include Himalayan blackberry (*Rubus discolor*) and Scotch broom (*Cytisus scoparius*).

3.5.2 Effects of the Action

Temporary increases in noise or turbidity from dredging activities may prevent access and refuge for salmonids and other species in the immediate vicinity of the work areas (see Sections 3.1 and 3.2).

The proposed dredging in the first year will occur below –5 feet CRD and therefore will not affect the shoreline or riparian habitat.

3.6 ACCESS AND REFUGIA

3.6.1 Existing Conditions

The International Terminals slip could provide refuge for salmonids during periods of high flow.

3.6.2 Effects of the Action

Temporary increases in noise or turbidity from dredging may prevent access and refuge for salmonids and other species in the immediate vicinity of the work areas during the period of dredging activity (see Sections 3.1 and 3.2).

3.7 BIOTA CONDITIONS

3.7.1 Existing Conditions

Benthic and epibenthic organisms in the Lower Willamette River basin include oligochaetes, mysid shrimp, amphipods, chironomid larvae, crayfish, and mollusks (Sanborn 1973 and FES 1995). Fish species include salmonids, largescale sucker (*Catostomus macrocheilus*), northern pikeminnow (*Ptychocheilus oregonesis*), perch (*Cymatogaster aggregate*), peamouth (*Mylocheilus caurinus*), sculpin (Cottidae), bluegill (*Lepomis macrochirus*), threespine stickleback (*Gasterosteus aculeatus*), and sturgeon (*Acipenser* spp.) (FES 1999).

3.7.2 Effects of the Action

Dredging will eliminate nonmobile benthos over approximately 9.6 acres of the bottom in the project area, temporarily reducing abundance and diversity. The newly exposed bottom should be quickly recolonized by infauna and epifauna (McCauley et al. 1977; Richardson et al. 1977; Romberg et al. 1995; Wilson and Romberg 1995). Diversity and health of the benthic assemblage recolonizing the dredged area should recover quickly and be similar to those of the subtidal benthic community now present. Areas adjacent to the project site will provide local larval sources for recolonization. Because of the prolonged period of planktonic larval development (several days to weeks) for most benthic species, currents will likely carry most larvae into the project area from plankton spawning outside of it.

By the spring outmigration period after dredging, the productivity of epibenthic prey for juvenile salmonids should be recovering, but may be less than the ultimate production of the area after a 1- to 2-year recolonization period. The contribution of epibenthic prey from the small subtidal area to be dredged is limited by the area's depth. Because the adjacent Willamette River and associated

shallow-water areas are so much larger than the area to be dredged, dredging should not harm salmonids foraging on benthic invertebrates.

Repeated disturbance from current use of the action area reduces ecological diversity. Proposed dredging will not increase this disturbance and therefore is not expected to have short-term direct effects on ecological diversity in the project area.

Avian species that now use the action area or that fly over it during dredging may modify their use of the area, moving away from construction activity.

Proposed dredging will not have short-term direct effects on aquatic vegetation within the project area because there are no known macroalgae beds there.

Proposed dredging will not have short-term direct effects on the pelagic prey in the project area because it will not degrade water quality enough to affect pelagic assemblages.

4.0 EVALUATION OF EFFECTS ON LISTED SPECIES

This section discusses life histories of listed species and the use of the action area. It evaluates temporary and permanent, direct and indirect effects on listed species from project activities (Section 2.2) and includes the effects determination. Detailed life histories are discussed in Corps 2000b. This section discusses only attributes of listed species that are likely to be affected by the project in some way.

An analysis of effects on Essential Fish Habitat (EFH) under the Magnuson-Stevens Fishery and Conservation Act is described in Appendix D.

4.1 LOWER COLUMBIA AND UPPER WILLAMETTE CHINOOK

4.1.1 Life History and Critical Habitat

Chinook salmon prefer to spawn and rear in the mainstem of rivers and larger streams. Although water temperatures determine the incubation period, fry typically hatch in about eight weeks. After emergence, juvenile chinook salmon migrate to saltwater during their first year (Corps 2000b).

Critical habitat is currently being reconsidered for Lower Columbia and Upper Willamette chinook. On April 30, 2002, the US District Court for the District of Columbia approved a NMFS consent decree withdrawing a February 2000 critical habitat designation for these and 17 other evolutionary significant units (ESUs) (NMFS 2000). Critical habitat consists of the water, substrate, and adjacent riparian zone of accessible estuarine and riverine reaches.

4.1.2 Use of the Action Area

Most chinook in the project area are likely to be migrating juveniles and adults. Juvenile chinook feed on benthic and epibenthic organisms in shallow nearshore areas. Adult chinook typically feed on other fish such as whitefish, sculpin and other trout. Therefore, adult chinook in the action area would likely be feeding on fish in the deeper water of the action area rather than the benthic and epibenthic organisms that are primary prey for juveniles.

4.1.3 Effects of the Action

No direct mortality of chinook is expected from any aspect of project construction, which will occur when few, if any, juvenile salmonids are present. Adult and juvenile chinook can avoid any proposed project conditions that would result in direct impacts (e.g. entrainment in the bucket) on them. Dredging will likely increase turbidity in the immediate vicinity. This impact will be only

temporary and the suspended sediment will dissipate quickly. Dredging will temporarily eliminate benthic organisms, an important food source for juvenile chinook. By the spring outmigration period after dredging, the productivity of epibenthic prey for juvenile salmonids should be recovering, but may be less than the ultimate production of the area after a 1- to 2-year recolonization period (McCauley et al. 1977; Richardson et al. 1977; Romberg et al. 1995; Wilson and Romberg 1995). The contribution of epibenthic prey from the small subtidal area to be dredged is limited by the area's depth. Because the adjacent Willamette River and associated shallow-water areas are so much larger than the area to be dredged, dredging should not harm salmonids foraging on benthic invertebrates. Seventy nine percent of the area to be dredged in the first year of the permit is below -20 feet CRD, deeper than migrating juveniles prefer (Simenstad et al. 1999). In subsequent years of the permit all maintenance dredging is anticipated to be below -20 feet CRD.

4.1.4 Effect Determination

Because of the lack of significant water quality impacts, and the short-term, localized nature of any reductions in prey abundance, the proposed project may affect, but is not likely to adversely affect chinook.

4.2 COLUMBIA RIVER CHUM SALMON

4.2.1 Life History and Critical Habitat

Chum salmon prefer to spawn at the head of the tidewater. Although the incubation period is determined by water temperatures, fry hatch in two weeks to four months. After emerging from the gravel, fry migrate immediately to marine waters, limiting their freshwater life history to a few days. Rearing and development to adulthood occur in the marine environment (Corps 2000b).

Critical habitat is currently under development for Columbia River chum following the NMFS consent decree withdrawing critical habitat designation for this and 18 other ESUs (NMFS 2000).

4.2.2 Use of the Action Area

Like chinook salmon, the majority of chum that occur within the project area are likely to be migrating juveniles and adults. Therefore, chum in the action area may be feeding on epibenthic organisms in the action areas as well as on organisms in water deeper than the action area.

4.2.3 Effects of the Action

The effects of the proposed action on chum would be similar to those described for chinook. However, unlike juvenile chinook, juvenile chum may not feed while migrating to saltwater.

Therefore, the impacts on epibenthic prey from construction may affect chum even less than the other listed salmonids.

4.2.4 Effect Determination

Because of the lack of significant water quality impacts, and the short-term, localized nature of any reductions in prey abundance, the proposed project may affect, but is not likely to adversely affect chum salmon.

4.3 LOWER COLUMBIA RIVER AND UPPER WILLAMETTE STEELHEAD TROUT

4.3.1 Life History and Critical Habitat

Steelhead trout spawn in tributaries of small and large rivers in late winter through spring. Juveniles migrate to the ocean after rearing in large rivers for one to four years. Steelhead spend one to three years in the ocean before returning to their natal streams to spawn. Unlike most anadromous salmonids, steelhead trout may return to their natal streams several times to spawn before they die (Corps 2000b).

Critical habitat has not been designated for coastal cutthroat steelhead trout (NMFS 2000).

4.3.2 Use of the Action Area

Juveniles, sub-adult, or adult steelhead trout may occur within the project area. Adult and sub-adult steelhead trout are typically piscivores, feeding on other fish such as whitefish, sculpin and other trout. Therefore, the adult and sub-adult steelhead trout in the action area would likely be feeding in the deeper water of the action area on fish rather than the insects that are primary prey for juveniles.

4.3.3 Effects of the Action

No direct mortality of steelhead trout is expected from any aspect of project construction, which will occur when few, if any, juvenile salmonids are present. Adult and juvenile steelhead trout can avoid any proposed project conditions that would result in direct impacts (e.g. entrainment in the bucket) on them. Dredging will likely increase turbidity temporarily in the immediate vicinity. Suspended sediment will dissipate quickly.

Dredging will eliminate benthic organisms, an important food source for juvenile steelhead trout. By the spring outmigration period after dredging, the productivity of epibenthic prey for juvenile salmonids should be recovering, but may be less than the ultimate production of the area after a 1- to 2-year recolonization period (McCauley et al. 1977; Richardson et al. 1977; Romberg et al. 1995;

Wilson and Romberg 1995). The contribution of epibenthic prey from the small subtidal area to be dredged is limited by the area's depth. Because the adjacent Willamette River and associated shallow-water areas are so much larger than the area to be dredged, dredging should not harm salmonids foraging on benthic invertebrates. Seventy nine percent of the area to be dredged is below -20 feet CRD, deeper than foraging juveniles prefer (Simenstad et al 1999). In subsequent years of the permit all maintenance dredging is anticipated to be below –20 feet CRD.

4.3.4 Effect Determination

Because of the lack of significant water quality impacts, and the short-term, localized nature of any reductions in prey abundance, the proposed project may affect, but is not likely to adversely affect steelhead trout.

4.4 BALD EAGLE

4.4.1 Life History and Critical Habitat

In Oregon, bald eagle breeding territories are mainly located in coniferous, uneven-aged stands with old-growth components. A variety of habitat characteristics influence territory size and configuration, including availability and location of perch trees for foraging, quality of foraging habitat, and distance of nests from waters supporting adequate food supplies. Bald eagles typically build nests in old-growth trees, which are generally used in successive years. Courtship and nest-building begin in January and February. Egg laying begins in March or early April, and eaglets hatch in mid-April or early May. They fledge in mid-July and often remain in the vicinity of the nest for another month (Rodrick and Milner 1991; Corps 2000b).

Eagles often depend on dead or weakened prey, and their diet may vary locally and seasonally. During the breeding season they eat anadromous and warmwater fishes, small mammals, carrion, small waterfowl, and seabirds. Various carrion, including spawned-out salmon, are important food sources during fall and winter (Rodrick and Milner 1991).

Critical habitat has not been designated for bald eagles.

4.4.2 Use of the Action Area

A species list obtained from the USFWS indicates that bald eagles may occur in the vicinity of the proposed project. No bald eagle nests are located in the action area. The closest nests are more than three 3 miles north and northwest of it (Dorsey, G., pers. comm., June 5, 2003).

The availability of suitable nest trees is often a limiting factor in the establishment of eagle territories (Carroll and Pentec 1992). Although there are no large trees in the action area for the bald eagles to roost or nest in, bald eagles occasionally fly over the area and may rest or perch on nearby pilings or cottonwood trees.

4.4.3 Effects of the Action

Construction could occur during the nesting season. However, since it would be more than 3 miles from the closest bald eagle nests, construction would not directly disrupt eagle nesting and rearing of young. No communal night roosts or perch trees are near the site, so wintering bald eagles would not be affected by construction that may occur during the wintering season. Foraging bald eagles may be displaced by the noise of heavy equipment, but the availability of prey would not be significantly disrupted by the proposed maintenance work. Given the surrounding urbanization and industrialization, eagles using the area are likely accustomed to high levels of human activity in the action area.

4.4.4 Effect Determination

Dredging will not affect nesting or wintering habitat or behaviors, and only minor disruptions to foraging may occur, so the proposed project may affect, but is not likely to adversely affect the bald eagle.

4.5 WATER HOWELLIA

4.5.1 Life History and Critical Habitat

Water howellia has historically occurred over a large area of the Pacific Northwest. Water howellia occurs in vernal ponds and shallow water edges of larger ponds, oxboughs, sloughs, or other slow-moving water bodies with fine sediment.

Critical habitat has not been designated for water howellia (Corps 2000b).

4.5.2 Use of the Action Area

There are no records of water howellia occurring in the action area and there is no habitat capable of supporting it there. Shallow-water areas in the action area are covered with riprap and do not contain the fine sediment preferred by water howellia. Additionally, boat traffic is likely to create sufficient wave action in the area to prevent establishment of water howellia, even if suitable substrate existed between riprap boulders.

4.5.3 Effects of the Action

Because water howellia is not known to exist in the action area and the action area does not contain habitat suitable for water howellia, dredging activities will not affect water howellia.

4.5.4 Effect Determination

Dredging activities will not affect potential water howellia habitat, as dredging will occur in water deeper than water howellia can tolerate. In addition, there is no suitable water howellia habitat in the action area. Thus the proposed project will have no effect on water howellia

4.6 COASTAL CUTTHROAT TROUT

4.6.1 Life History and Critical Habitat

Coastal cutthroat trout spawn in small tributaries of small and large rivers in late winter through spring. Juveniles migrate downstream between March and June and may make several freshwater migrations before migrating to the ocean. Most coastal cutthroat trout are 2 to 3 years old before migrating to the ocean. Coastal cutthroat trout spend less than one year in the ocean before migrating back to their natal streams to spawn. Unlike most anadromous salmonids, coastal cutthroat trout do not die after spawning (Corps 2000b).

Critical habitat has not been designated for coastal cutthroat trout (NMFS 2000).

4.6.2 Use of the Action Area

Most coastal cutthroat trout in the project area are likely to be adults and sub-adults from nearby basins. Adult and sub-adult coastal cutthroat trout typically feed on other fish such as whitefish, sculpin, and other trout. Therefore, the adult and sub-adult coastal cutthroat trout in the action area would likely be feeding in the deeper water of the action area on fish rather than the organisms that serve as primary prey for juveniles.

4.6.3 Effects of the Action

No direct effect on coastal cutthroat trout is expected to result from any aspect of project construction, which will occur when few, if any, juvenile salmonids are present. Adult salmonids can avoid any conditions that would result in direct impacts (e.g. entrainment in the bucket) on them. Dredging will likely increase turbidity temporarily in the immediate vicinity. Suspended sediment will dissipate quickly.

Dredging will eliminate benthic organisms, an important food source for juvenile coastal cutthroat trout. By the spring outmigration period after dredging, the productivity of epibenthic prey for juvenile salmonids should be recovering, but may be less than the ultimate production of the area after a 1- to 2-year recolonization period (McCauley et al. 1977; Richardson et al. 1977; Romberg et al. 1995; Wilson and Romberg 1995). The contribution of epibenthic prey from the small subtidal area to be dredged is limited by the area's depth. Because the adjacent Willamette River and associated shallow-water areas are so much larger than the area to be dredged, dredging should not harm salmonids foraging on benthic invertebrates. Additionally, seventy nine percent of the area to be dredged is below -20 feet CRD, which is deeper than foraging juveniles prefer (Simenstad et al. 1999). In subsequent years of the permit all maintenance dredging is anticipated to be below -20 feet CRD.

4.6.4 Effect Determination

Because of the lack of significant water quality impacts, and the short-term, localized nature of any reductions in prey abundance, the proposed project will not jeopardize coastal cutthroat trout. Should coastal cutthroat trout become listed the proposed project may affect, but is not likely to adversely affect, cutthroat trout or their habitat.

4.7 LOWER COLUMBIA RIVER COHO SALMON

4.7.1 Life History and Critical Habitat

Coho spawn in small tributaries of small or large rivers in late winter through spring. Juveniles migrate downstream between April and August. Juvenile coho may spend anywhere from a few weeks to two years in freshwater before migrating to the ocean. Coho spend one to two years in the ocean before migrating back to their natal streams to spawn (Corps 2000b).

Critical habitat has not been designated for Lower Columbia River coho salmon.

4.7.2 Use of the Action Area

Most coho in the project area are likely to be adults and sub-adults from nearby basins. Adult and sub-adult coho typically feed on other fish such as whitefish, sculpin, and other trout. By the time adult coho reach the Willamette River, they probably are not feeding. Sub-adult coho in the action area would likely be feeding in the deeper water of the action area on fish rather than the benthic and epibenthic organisms that serve as primary prey for juveniles.

4.7.3 Effects of the Action

The effects of the proposed action on coho would be similar to those described for chinook. Impacts on epibenthic prey from construction could have less impact on coho than other salmonid species because coho found in the action area are likely to be less dependant on epibenthic prey than chinook.

4.7.4 Effect Determination

Because of the lack of significant water quality impacts, and the short-term, localized nature of any reductions in prey abundance, the proposed project will not jeopardize coho salmon. If coho are listed, the proposed project may affect, but is not likely to adversely affect, coho salmon or their habitat.

5.0 INTERRELATED, INTERDEPENDENT, AND CUMULATIVE EFFECTS

Cumulative effects are those effects of future state or private activities, not involving activities of other federal agencies that are reasonably certain to occur within the area of the federal action subject to consultation (50 CFR 402.02 Definitions). Future federal actions unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to Section 7 of the ESA. Interdependent effects are defined as actions with no independent utility apart from the proposed action. Interrelated effects include those that are part of a larger action and depend on the larger action for justification.

No interdependent or cumulative effects are known to occur that may adversely affect a listed, proposed, or candidate species within the action area. An interrelated action of the proposed action may be the occasional disturbance of the substrate from prop wash of tugs as they bring in barges or during the hauling out of barges or other vessels. Prop wash could result in small, temporary increases in turbidity. The periodic disturbance of the substrate caused by the prop wash could reduce the suitability of the substrate for colonization by benthic macroinvertebrates utilized as food by juvenile salmonids. However, these effects of prop wash being localized and temporary would have little affect on the growth or survival of juvenile salmonids.

6.0 SUMMARY

Construction activities would temporarily increase noise and turbidity, possibly causing listed species to avoid the immediate work area. Best management practices would be used to reduce these impacts. Thus, the proposed action:

- **may affect, but is not likely to adversely affect** chinook salmon,
- **may affect, but is not likely to adversely affect** chum salmon,
- **may affect, but is not likely to adversely affect** steelhead trout,
- **may affect, but is not likely to adversely affect** bald eagles, and
- will have **no effect** on water howellia.

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DEPARTMENT
ENVIRONMEI
QUALITY

WATER QUALITY 401 CERTIFICATION
Public Notice

WHO IS THE APPLICANT: See the attached Department of State Lands (DSL) and or Corps of Engineers (COE) permit application.

WHAT IS PROPOSED: See the attached DSL and or COE permit application on the proposed project.

DESCRIPTION OF DISCHARGES: See the attached DSL and or COE permit for details.

NEED FOR CERTIFICATION: Under Section 401 of the Clean Water Act, any activity that requires a federal permit or license requires certification from the State that any discharge will meet the requirements of the Clean Water Act and State water quality standards.

PUBLIC PARTICIPATION: Written comments must be received by 5 p.m. no later than thirty days from the notice issued date at the Oregon Department of Environmental Quality, Water Quality Division, 811 S.W. 6th Ave., Portland, Oregon 97204 to be included in the official record. Public comments should specifically include new data addressing how the project would affect requirements of the Clean Water Act and Oregon water quality standards.

The applicant, any affected state, or any interested agency, person or group of persons, may request a publi hearing with respect to this certification application. If the Director determines new data would be produce a public hearing will be held prior to the director's final determination. There shall be notification of such a hearing.

HOW TO GET ADDITIONAL INFORMATION: The application and related documents are available for inspection during the public comment period, Monday through Friday, between 9:00 am to noon and 1:00 pm to 4:00 pm at DEQ's Portland office. Please call in advance for an appointment 229-5279.

People wishing to receive a copy of the DSL/COE application can call DEQ at (503) 229-5279 or toll free in Oregon at 1-800-452-4011. Public Records Act charges may apply. Persons with a hearing impairment ca receive help by calling DEQ's TDD number at (503) 229-6993.

WHAT HAPPENS NEXT: After the conclusion of the public participation period, the permit will be issued a proposed, issued with modifications, or denied, depending on comments received during the public participation process. Interested parties can request to be notified of the final determination by writing or calling the Department at the above address.

ACCESSIBILITY INFORMATION: This publication is available in alternate format (e.g. large print, braille) upon request. Please contact Ed Sale in DEQ Public Affairs at 229-5766 to request an alternate format.

811 SW Sixth A
Portland, OR 9
(503) 229-5696
TDD (503) 229
DEQ-1

Department of State Lands
775 Summer Street NE, Suite 100
Salem, OR 97301-1279
☎ 503-378-3805

Permit No.:	**30895-RP**
Permit Type:	**Removal**
Waterway:	**Willamette River**
County:	**Multnomah**
Expiration Date:	**January 14, 2005**
Corps No.:	**1992-00812**

SCHNITZER STEEL INDUSTRIES, INC.

IS AUTHORIZED IN ACCORDANCE WITH ORS 196.800 TO 196.990 TO PERFORM THE OPERATIONS DESCRIBED IN THE ATTACHED COPY OF THE APPLICATION, SUBJECT TO THE SPECIAL CONDITIONS LISTED ON ATTACHMENT A AND TO THE FOLLOWING GENERAL CONDITIONS:

1. This permit does not authorize trespass on the lands of others. The permit holder shall obtain all necessary access permits or rights-of-way before entering lands owned by another.
2. This permit does not authorize any work that is not in compliance with local zoning or other local, state, or federal regulation pertaining to the operations authorized by this permit. The permit holder is responsible for obtaining the necessary approvals and permits before proceeding under this permit.
3. All work done under this permit must comply with Oregon Administrative Rules, Chapter 340; Standards of Quality for Public Waters of Oregon. Specific water quality provisions for this project are set forth on Attachment A.
4. Violations of the terms and conditions of this permit are subject to administrative and/or legal action which may result in revocation of the permit or damages. The permit holder is responsible for the activities of all contractors or other operators involved in work done at the site or under this permit.
5. A copy of the permit shall be available at the work site whenever operations authorized by the permit are being conducted.
6. Employees of the Department of State Lands and all duly authorized representatives of the Director shall be permitted access to the project area at all reasonable times for the purpose of inspecting work performed under this permit.
7. Any permit holder who objects to the conditions of this permit may request a hearing from the Director, in writing, within 10 days of the date this permit was issued.
8. In issuing this permit, the Department of State Lands makes no representation regarding the quality or adequacy of the permitted project design, materials, construction, or maintenance, except to approve the project's design and materials, as set forth in the permit application, as satisfying the resource protection, scenic, safety, recreation, and public access requirements of ORS Chapters 196, 390 and related administrative rules.
9. Permittee shall defend and hold harmless the State of Oregon, and its officers, agents, and employees from any claim, suit, or action for property damage or personal injury or death arising out of the design, material, construction, or maintenance of the permitted improvements.

NOTICE: If removal is from state-owned submerged and submersible land, the applicant must comply with leasing and royalty provisions of ORS 274.530. If the project involves creation of new lands by filling on state-owned submerged or submersible lands, you must comply with ORS 274.905 - 274.940. This permit does not relieve the permittee of an obligation to secure appropriate leases from the Department of State Lands, to conduct activities on state-owned submerged or submersible lands. Failure to comply with these requirements may result in civil or criminal liability. For more information about these requirements, please contact the Department of State Lands, 378-3805.

Lori Warner, Manager
Western Region Field Operations
Oregon Department of State Lands

Lori Warn
Authorized Signature

January 15, 2004
Date Issued

Salem1\FO\Forms\Authorization\Permit Face.doc

ATTACHMENT A

Special Conditions for Removal/Fill Permit No. 30895-RP. PLEASE READ AND BECOME FAMILIAR WITH CONDITIONS OF YOUR PERMIT. This project may be site inspected by the Division of State Lands as part of our monitoring program. The Division has the right to stop or modify the project at any time if you are not in compliance with these conditions. A copy of this permit shall be available at the work site whenever authorized operations are being conducted.

1. This permit authorizes the removal of up to 101,000 cubic yards (total project) of sand and silt at International Terminals Berths 4 and 5 located at T2N, R1W, Section 35, tax lot 500, at Willamette River, mile 3.8, Portland, Multnomah County for maintenance dredging as outlined in the attached permit application, map and drawings, dated July 9, 2003.

2. No removal activities shall commence within waters of the State without first obtaining any required authorization from the City of Portland for upland disposal. If the local permit(s) results in any modifications in this project relative to this permit, the permit holder shall contact the Division and request adjustments to this authorization.

3. Removal activities in Willamette River, mile 3.8, International Terminal Berths 4 and 5, shall be conducted between July 1 and October 31 (any year with valid permit) and between January 1 and January 31, 2004, unless otherwise coordinated with ODFW and approved in writing by ODSL.

4. The dimensions and depth of the berths shall be no greater than described in Application, Sheets 2 of 3 and 3 of 3. Any alteration of the plan requires Division of State Lands approval.

5. Dredging activity shall be conducted by clamshell bucket from a floating crane and as described Application. In the closed position, the bucket shall be sealed so as to minimize sediment resuspension. The barge shall be positioned so as to avoid grounding on the river bed or banks at any time.

6. All dredge materials shall be placed in barges equipped such that no material shall discharge to waters of the State during loading, transfer and unloading activity.

7. Any return waters generated during transfer and disposal activity shall be provided adequate settling time so that return waters meet water quality requirements of the Department of Environmental Quality.

8. Dredged materials shall be disposed of in appropriately permitted, upland disposal site(s). The selected disposal facility(ies), and any changes thereafter, shall be submitted to the Division for approval prior to use.

9. Any beneficial reuse of dredged materials is subject to a license from, and royalty payments to, the Division of State Lands.

Water Quality Conditions

10. Dredging activity shall conducted in strict compliance with the DEQ approved Water Quality Management Plan (WQMP) for the site. The approved WQMP and its contents are incorporated into and become a binding condition of this Permit. The Plan outlines: an effects-based turbidity standard; implementation of action level and stop-work level turbidity thresholds; monitoring protocols; and reporting requirements.

11. Petroleum products, chemicals, fresh cement, sandblasted material and chipped paint or other deleterious waste materials shall not be allowed to enter waters of the state. No wood treated with leach able preservatives shall be placed in the waterway. Machinery refueling is to occur off-site or in a confined designated area to prevent spillage into waters of the state. Project-related spills into water of the state or onto land with a potential to enter waters of the state shall be reported to the Oregon Emergency Response System at 800-452-0311.

Contingencies

12. If any archaeological resources and/or artifacts are uncovered during excavation, all construction activity shall immediately cease. The State Historic Preservation Office shall be contacted (phone: 503-378-4168).

13. When listed species are present, the permit holder must comply with the federal Endangered Species Act. If previously unknown listed species are encountered during the project, the permit holder shall contact the appropriate agency as soon as possible.

14. The permittee is responsible for carrying-out the terms and conditions of this permit unless the permit is transferred to another party using forms provided by the Division.

15. The Division of State Lands retains the authority to temporarily halt or modify the project in case of unforeseen damage to natural resources.

Lower Willamette River Management Plan Consistency

The proposed activity at Willamette River, mile 3.8, is located within a designated "Open Water" area of the Lower Willamette River Management Plan (Plan). Maintenance dredging is identified in the Plan as an allowable activity in designated open waters, subject to the following additional conditions.

16. Schedule project development and maintenance to avoid peak public use periods for recreation activities present in the project area.

17. Schedule project development and maintenance to assure, as much as possible, that commercial navigational uses (barge, ship, tug traffic) remain unimpeded.

18. Strictly adhere to all public health, safety, and water quality standards, building and zoning codes required by the appropriate local government agencies, the Oregon Water Resources Department, the Oregon Department of Environmental Quality, and U.S. Environmental Protection Agency. Obtain all necessary permits and comply with all permit conditions.

19. There shall be no significant adverse effect to the riparian and aquatic life and habitat by any activity within shallow water (-15 feet Columbia River datum) or Rank 1 and 2 wildlife habitat areas.

20. The area dredged shall be the minimum necessary to accomplish the intended use and comply with these standards.

21. For access dredging, normal removal shall be sufficient to provide access for a period no less than 24 months.

22. Levels of pollutants released into waters by dredging and disposal shall conform to standards approved by DEQ.

23. Sides of dredged channels and basins should be sloped to facilitate physical stabilization. Slopes shall be no steeper than 3:1.

24. Critical periods of fish and wildlife activity as determined by Oregon Department of Fish and Wildlife (ODFW) (spawning, passage, nesting, etc.) shall be avoided.

25. Dredging will not be allowed from public beach areas.

26. All dredging operations must use disposal sites acceptable to the U.S. Army Corps of Engineers, the Division of State Lands, and local land use regulations.

27. Dredging shall be timed so that equipment stays clear of recreational and commercial navigation users of the river, especially during the recreation use season (March – October).

January 15, 2004

J:\AttachmentAwestLAS\RP Removal Permits\30895-RP.doc

US Army Corps of Engineers
Portland District

JOINT
PERMIT APPLICATION FORM

THIS APPLICATION WILL MEET THE REQUIREMENTS OF BOTH AGENCIES

AGENCIES WILL ASSIGN NUMBERS

Corps Action ID Number _____ Oregon Division of State Lands Number 30895-RP

RECEIVED
JUL 09 2003
DIVISION OF STATE LANDS

SEND ONE SIGNED COPY OF YOUR APPLICATION TO EACH AGENCY

District Engineer
ATTN: CENWP-OP-GP
P.O. Box 2946
Portland, OR 97208-2946
503-808-4373

State of Oregon:
Division of State Lands
775 Summer Street N.E.
Salem, OR 97310
503-378-3805

1. APPLICANT NAME: Schnitzer Steel Industries, Inc.
Address: PO Box 10047
Portland, OR 97296-0047
Attn: Jim Jakubiak

Business Phone #: (503) 224-9900
Home Phone #: N/A
FAX #: (503) 286-6948

[ ] Co-Applicant [x] Authorized Agent [ ] Contractor

Name: Jerald Ramsden
Address: Parsons Brinckerhoff Quade & Douglas, Inc.
400 SW 6th Ave., Suite 802
Portland, OR 97204

Business Phone #: (503) 274-8772
Home Phone #: N/A
FAX #: (503) 274-1412

Property Owner *(if different than applicant)*
Name: Schnitzer Investment Corporation
Address: PO Box 10047
Portland, OR 97296-0047

Business Phone #: (503) 224-9900
Home Phone #: N/A
FAX #: N/A

2. PROJECT LOCATION

Street, road or other descriptive location
International Terminals
12005 N. Burgard Rd.

Legal Description

Quarter	Section	Township	Range
SW	35	[2] North [ ] South	[ ] East [1] West

In or Near (City or Town) Portland County Multnomah Tax Map # 2N1W35 Tax Lot # 500
Waterway Willamette River River Mile 3.8 Latitude 45° 36' 30" N Longitude 122° 46' 52" W

Is consent to enter property granted to the Corps and the Division of State Lands? [x] Yes [ ] No

3. PROPOSED PROJECT INFORMATION

Activity Type: [ ] Fill [x] Excavation (removal) [ ] In-Water Structure [ ] Maintain/Repair an Existing Structure
Brief Description: Maintenance dredging to provide safe navigation access to and berthing within Berths 4 and 5 at International Terminals

Fill will involve N/A cubic yards annually and/or _____ cubic yards for the total project
_____ cubic yards in a wetland or below the ordinary high water or high tide line

Fill will be: [ ] Riprap [ ] Rock [ ] Gravel [ ] Sand [ ] Silt [ ] Clay [ ] Organics [ ] Other _____

Fill Impact Area is _____ Acres; _____ length; _____ width; _____ depth

Removal will involve 20,000 every other year on average cubic yards annually and/or 101,000 (i.e. 61,000 initially and 40,000 thereafter) cubic yards for the total project
101,000 cubic yards below the ordinary high water or high tide line

SCHN00158036

Removal will be: [ ] Riprap [ ] Rock [ ] Gravel [x] Sand [x] Silt [ ] Clay [ ] Organics [ ] Other _____

Removal Impact Area is								
	6.6 first year, 3.7 thereafter	Acres;	1600 ft	length;	120 ft typical (220 ft max.)	width;	Varies: max of -42 ft CRD in Berth 4 and -36 ft CRD in Berth 5	depth

Is the Disposal area: Upland? [x] Yes [ ] No Wetland/Waterway? [ ] Yes [x] No

	Yes	No
Are you aware of any Endangered Species on the project site?	x	
Are you aware of any Cultural Resources on the project site?		x
Is the project site near a Wild and Scenic River?		x

If Yes, please explain in the project description (on page 2, block 4).

4. PROPOSED PROJECT PURPOSE AND DESCRIPTION

Project Purpose and Need: Presented in attached supplemental sheets.

Project Description: Presented in attached supplemental sheets.

How many project drawing sheets are included with this application? 3

NOTE: A complete application must include drawings and a location map submitted on separate 8-1/2 x 11 sheets.

Will any material, construction debris, runoff, etc. enter a wetland or waterway? ☐ Yes ☒ No

If yes, describe the type of discharge (above) and show the discharge location on the site plan.

Estimated Start Date: August 15, 2003 Estimated Completion Date: August 14, 2008

5. PROJECT IMPACTS AND ALTERNATIVES

Describe alternative sites and project designs that were considered to avoid impacts to the waterway or wetland.

Presented in attached supplemental sheets.

Describe what measures you will use (before and after construction) to minimize impacts to the waterway or wetland.

Presented in attached supplemental sheets.

NOTE: If necessary, use additional sheets.

6. ADDITIONAL INFORMATION

Adjoining Property Owners and Their Addresses and Phone Numbers.

Port of Portland
121 NW Everett
Portland, OR 97209
(503) 944-7000

Northwest Terminal Company
P.O. Box 99007
Seattle, WA 98199-0007

Has the proposed activity or any related activity received the attention of the Corps of Engineers or the State of Oregon in the past, e.g., wetland delineation, violation, permit, lease request, etc.? ☒ Yes ☐ No

If yes, what identification number(s) were assigned by the respective agencies?

Corps # 92-00812 State of Oregon# 3701

SCHN00158038

7. **CITY/COUNTY PLANNING DEPARTMENT AFFIDAVIT** (to be completed by local planning official)

☐ This project is not regulated by the local comprehensive plan and zoning ordinance.

☒ This project has been reviewed and is consistent with the local comprehensive plan and zoning ordinance. (Not approving upland disposal site)

☐ This project has been reviewed and is **not** consistent with the local comprehensive plan and zoning ordinance.

☐ Consistency of this project with the local planning ordinance cannot be determined until the following local approval(s) are obtained:

- ☐ Conditional Use Approval
- ☐ Development Permit
- ☐ Plan Amendment
- ☐ Zone Change
- ☐ Other _____

An application ☐ has ☐ has not been made for local approvals checked above.

Signature (of local planning official)	Title	City/County	Date
[signature]	City Planner	Portland	6/27/03

8. **COASTAL ZONE CERTIFICATION**

If the proposed activity described in your permit application is within the Oregon coastal zone, the following certification is required before your application can be processed. A public notice will be issued with the certification statement which will be forwarded to the Oregon Department of Land Conservation and Development (DLCD) for its concurrence or objection. For additional information on the Oregon Coastal Zone Management Program, contact the department at 1175 Court Street N.E., Salem, Oregon 97310 or call 503-373-0050.

Certification Statement

I certify that, to the best of my knowledge and belief, the proposed activity described in this application complies with the approved Oregon Coastal Zone Management Program and will be completed in a manner consistent with the program.

Print/Type Name	Title
Applicant Signature	Date

9. **SIGNATURE FOR JOINT APPLICATION (REQUIRED)**

Application is hereby made for the activities described herein. I certify that I am familiar with the information contained in the application, and, to the best of my knowledge and belief, this information is true, complete, and accurate. I further certify that I possess the authority including the necessary requisite property interests to undertake the proposed activities. I understand that the granting of other permits by local, county, state or federal agencies does not release me from the requirements of obtaining the permits requested before commencing the project. I understand that local permits may be required before the state removal-fill permit is issued. I understand that payment of the required state processing fee does not guarantee permit issuance.

Print/Type Name (applicant)	Title
James L. Jakubiak	Environmental Administrator
Applicant Signature (applicant)	Date
[signature]	June 27, 2003

I certify that I may act as the duly authorized agent of the applicant.

Print/Type Name	Title
Jerald D. Ramsden	Lead Coastal Engineer
Authorized Agent Signature)	Date
[signature]	June 27, 2003

SCHN00158039

SUPPLEMENTAL WETLAND IMPACT INFORMATION*
(FOR WETLAND FILLS ONLY)

Site Conditions of impact area

Impact area is: [ ] Ocean [ ] Estuary [X] River [ ] Lake [ ] Stream [ ] Freshwater Wetland

Note: Estuarian Resource Replacement is required by state law for projects involving intertidal or tidal marsh alterations. A separate Wetlands Resource Compensation Plan may be appended to the application.

Has a wetland delineation been completed for this site? [ ] Yes [X] No

If yes, by whom:

Describe the existing physical and biological character of the wetland/waterway site by area and type of resource (use separate sheets and photos, if necessary).

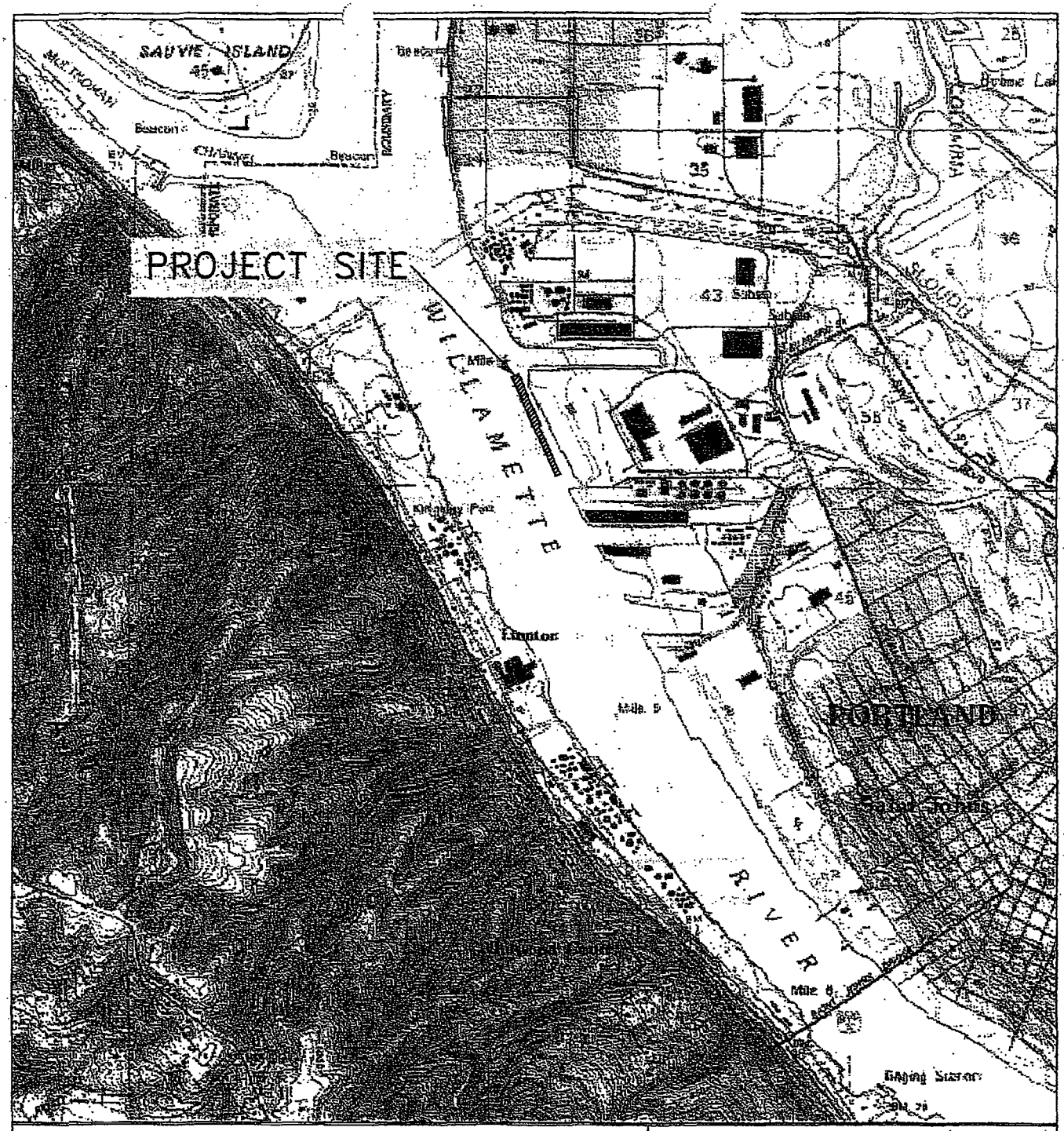
Presented in the attached Biological Assessment

Resource Replacement Mitigation
Describe measures to be taken to replace unavoidably impacted wetland resources.

No wetland resources are affected by the proposed work. Therefore, no mitigation is proposed.

* Because this information is not necessary for a complete application, you may submit this sheet and other environmental information after submitting your application.

SCHN00158040



NOTE 1. LOCATION MAP OBTAINED FROM US GEOLOGICAL SURVEY QUAD SHEET FOR LINNTON, OR

PURPOSE: MAINTAIN NAVIGATION ACCESS AND BERTHS FOR SHIPS AND BARGES

VERTICAL DATUM: COLUMBIA RIVER DATUM (CRD), CRD IS 1.6' ABOVE NGVD AT WILLAMETTE RIVER MILE 3.8

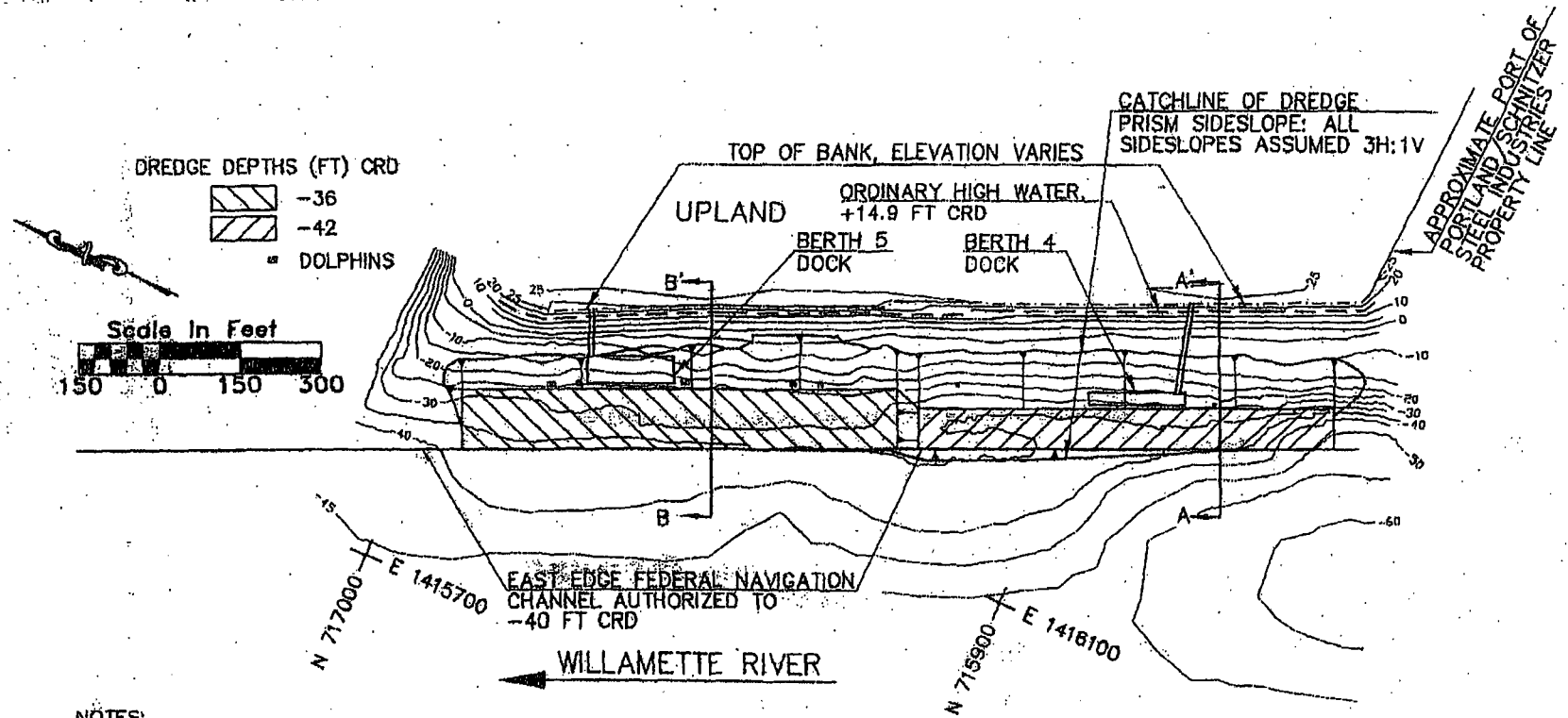
ADJACENT PROPERTY OWNERS:
1. NORTHWEST TERMINAL COMPANY
2. PORT OF PORTLAND

LATITUDE: 45° 36' 30" N
LONGITUDE: 122° 46' 52" W

PROPOSED MAINTENANCE DREDGING AT INTERNATIONAL TERMINALS

IN: WILLAMETTE RIVER
AT: RIVER MILE 3.8
COUNTY OF: MULTNOMAH
APPLICATION BY: SCHNITZER STEEL INDUSTRIES, INC.
SHEET 1 OF 3 DATE: 6/03/03

SCHN00158041



NOTES:

NOTE 2. THE ORDINARY HIGH WATER ELEVATION IS 14.9 FT CRD ACCORDING TO THE U.S. ARMY CORPS OF ENGINEERS, PORTLAND DISTRICT.

NOTE 3. DEPTH SOUNDINGS (FEET, CRD) WERE MEASURED BY MINISTER & GLAESER SURVEYING, INC. IN SEPTEMBER, 2002.

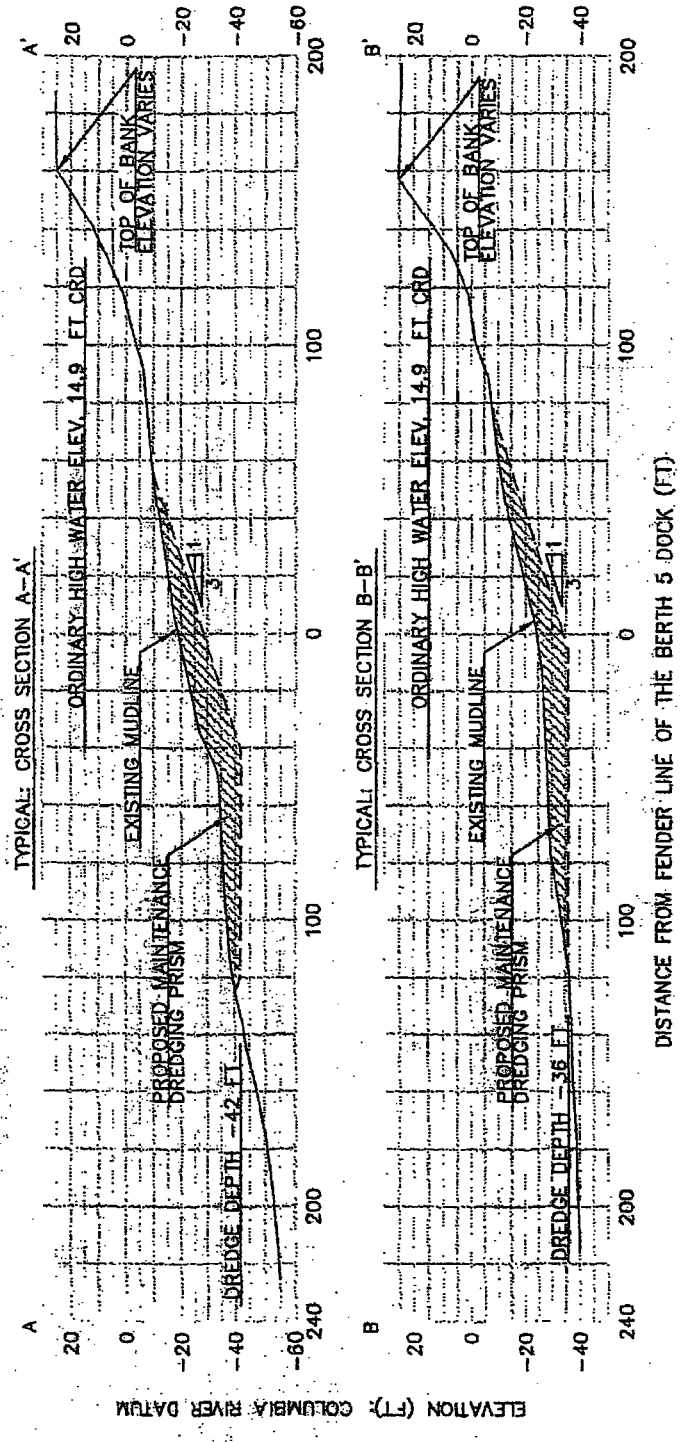
NOTE 4. SCHNITZER STEEL INDUSTRIES, INC. PROPOSES TO INITIALLY DREDGE AN ESTIMATED 61,000± CY AS SHOWN. ESTIMATED MAINTENANCE DREDGING TO REMOVE NATURALLY SHOALED MATERIALS INCLUDES UP TO 40,000 CY (I.E. 20,000± CY EVERY OTHER YEAR ON AVERAGE) IN SUBSEQUENT YEARS.

NOTE 5. DREDGING DEPTHS SHOWN ARE MAXIMUM DEPTHS AND INCLUDE ONE FOOT OF ADVANCED MAINTENANCE AND ONE FOOT OF ALLOWABLE OVERDEPTH DUE TO DREDGING INACCURACY.

NOTE 6. SCHNITZER STEEL INDUSTRIES, INC. PROPOSES TO DREDGE THE MATERIAL USING A CLAMSHELL BUCKET OPERATED FROM A FLOATING CRANE. DREDGED MATERIAL WILL BE PLACED IN APPROVED UPLAND LOCATIONS.

	PURPOSE: MAINTAIN NAVIGATION ACCESS AND BERTHS FOR SHIPS AND BARGES VERTICAL DATUM: COLUMBIA RIVER DATUM (CRD), CRD IS 1.6' ABOVE NGVD AT WILLAMETTE RIVER MILE 3.8 ADJACENT PROPERTY OWNERS: 1. NORTHWEST TERMINAL COMPANY 2. PORT OF PORTLAND	LATITUDE: 45° 36' 30" N LONGITUDE: 122° 46' 52" W HORIZONTAL DATUM: OREGON STATE PLANE COORDINATE SYSTEM, NORTH ZONE (NAD-27), U.S. SURVEY FEET	PROPOSED MAINTENANCE DREDGING AT INTERNATIONAL TERMINALS IN: WILLAMETTE RIVER AT: RIVER MILE 3.8 COUNTY OF: MULTNOMAH APPLICATION BY: SCHNITZER STEEL INDUSTRIES, INC. SHEET 2 OF 3 DATE: 6/03/03

SCHN00158042



PURPOSE: MAINTAIN NAVIGATION ACCESS AND BERTHS FOR SHIPS AND BARGES
VERTICAL DATUM: COLUMBIA RIVER DATUM (CRD), CRD IS 1.6' ABOVE NGVD AT WILLAMETTE RIVER MILE 3.8
ADJACENT PROPERTY OWNERS:
1. NORTHWEST TERMINAL COMPANY
2. PORT OF PORTLAND

LATITUDE: 45° 36' 30" N
LONGITUDE: 122° 46' 52" W

SCALE: AS SHOWN

PROPOSED MAINTENANCE DREDGING AT INTERNATIONAL TERMINALS

IN: WILLAMETTE RIVER
AT: RIVER MILE 3.8
COUNTY OF: MULTNOMAH
APPLICATION BY: SCHNITZER STEEL INDUSTRIES, INC.
SHEET 3 OF 3 DATE: 6/03/03

SCHN00158043

SUPPLEMENTAL DATA

Joint Application for Maintenance Dredging in Berths 4 and 5,
International Terminals, Portland, Oregon

4. PROPOSED PROJECT PURPOSE AND DESCRIPTION

Project Purpose and Need
The project purpose is to maintain safe navigation access and berthing for the existing facilities associated with Berths 4 and 5 at International Terminals (as shown in Sketch 1 of 3, attached) by conducting periodic maintenance dredging as needed. The two berths are existing facilities and have been maintained under previous maintenance dredging permits (U.S. Army Corps of Engineers Section 10/404 Permit #92-00812 and Oregon Division of State Lands Removal-Fill Permit No. 3701).

Berth 4 is currently used to export bulk metal products with a conveyor system. Berth 5 has a floating dock with a crane and is used for temporary moorage. The two berths combined are approximately 1600 ft long. The site was originally developed in the early 1940's for military ship construction. Over the past three decades, the site has been primarily used to support metal recycling and vessel dismantling operations.

Due to shoaling within each of the berths, there is a critical and urgent need to maintain these facilities as shown by the proposed dredge prism in sketch 3 of 3, attached.

Project Description
The project involves dredging the area to a maximum depth of –42 ft Columbia River Datum (CRD) in Berth 4 and -36 ft CRD in Berth 5 as shown in Sketches 2 and 3 of 3, attached. The proposed dredge footprint covers an area of approximately 6.6 acres with a maximum length of 1600 ft and maximum width of 220 ft. The initial dredge volume associated with the proposed dredge prism is 61,000 cy. Authorization for an additional 40,000 cy is requested for the remainder of the permit duration (i.e. 20,000 cy every other year on average in years two through five, based on a five year permit). Dredging will be by clamshell bucket with transport to approved upland facilities and/or locations by barge, truck and/or rail.

Recent sediment sampling results are attached to this application and have been utilized in development of the Biological Assessment.

5. PROJECT IMPACTS AND ALTERNATIVES

Describe alternative sites and project designs that were considered to avoid impacts to the waterway or wetland.
No alternatives were considered for maintenance dredging in the berths since they are existing, previously permitted facilities in need of maintenance. The site is designated for marine industrial use by the Lower Willamette River Management Plan, which recognizes

the important need to protect and fully utilize the limited areas of Portland Harbor so designated.

Describe what measures you will use (before and after construction) to minimize impacts to the waterway or wetland.

Construction will be conducted during an allowable fish-related inwater work period, although the emergency need and permitting time frame may require extension of the regularly scheduled Oct. 31 and/or Jan. 31 closure to allow completion of the project. Best management practices will be utilized during maintenance dredging as outlined in the Programmatic Biological Opinion (National Marine Fisheries Service dated June 14, 2002 that covers maintenance dredging of existing port terminals) and the Corps of Engineers Nationwide Permit (that includes maintenance dredging) to protect water quality and benthic resources. The proposed dredging will provide one foot of advanced maintenance (already accounted for in the maximum proposed dredge depths) to reduce to the extent practicable the frequency of maintenance dredging events.

INTERNATIONAL TERMINALS (BERTHS 4 AND 5) MAINTENANCE DREDGING BIOLOGICAL ASSESSMENT

Portland, Oregon

Prepared for

Parsons Brinckerhoff

400 SW Sixth Street, Suite 802

Portland, OR 97204

Prepared by

MCS Environmental, Inc.

6505 – 216th Street SW, Suite 100

Mountlake Terrace, WA 98043

July 8, 2003

34088-001

CONTENTS

CONTENTS (continued)

CONTENTS (continued)

APPENDICES

LIST OF TABLES

LIST OF FIGURES

International Terminals (Berths 4 and 5) Maintenance Dredging

1.0 INTRODUCTION

Section 7 of the Endangered Species Act (ESA) requires federal agencies to ensure that any action carried out by the agency is "not likely to jeopardize the continued existence of any [listed] species or result in the destruction or adverse modification of habitat of such species...." Issuance of a federal permit is an agency action pursuant to Section 7.

Schnitzer Steel Industries, Inc. (SSI) is applying for a permit from the US Army Corps of Engineers (Corps) to conduct maintenance dredging of Berths 4 and 5 at the International Terminals site. This requires a Section 10/404 permit from the Corps, which qualifies as an action by a federal agency for purposes of Section 7 of the ESA. Pursuant to Section 7, the Corps is required to produce a biological evaluation (BE) of the potential effect of issuing the permit on listed species or their critical habitat. To help the Corps evaluate the potential effects of the proposed project on listed species, MCS Environmental, Inc. (MCS) has prepared this Biological Assessment (BA) on the behalf of SSI.

To determine if listed species or their critical habitat are in the vicinity of the proposed project, MCS consulted the National Marine Fisheries Service (NMFS), Northwest Region <http://www.nwr.noaa.gov/esalist.htm> and sent a written request to the US Fish and Wildlife Service (USFWS). Based on information from the NMFS Website and a response from USFWS (McMaster, K., USFWS, pers. com., June 12, 2003; Appendix A), the following listed species may occur in the project area and are therefore addressed in this BA:

- Lower Columbia River chinook salmon (*Oncorhynchus tshawytscha*), listed as threatened in 1999.
- Upper Willamette River chinook salmon (*O. tshawytscha*), listed as threatened in 1999.
- Columbia River run chum salmon (*O. keta*), listed as threatened in 1999.
- Lower Columbia River steelhead trout (*O. mykiss*), listed as threatened in 1998.
- Upper Willamette River steelhead trout (*O. mykiss*), listed as threatened in 1999.
- Bald eagle (*Haliaeetus leucocephalus*), listed as threatened in 1978.
- Water howellia (*Howellia aquatilis*), listed as threatened in 1994.

This BA also addresses southwestern Washington–Columbia River coastal cutthroat trout (*O. clarki clarki*), a species proposed for listing and Lower Columbia River–Southwest Washington coho salmon (*O. kisutch*), a candidate for listing. Should cutthroat trout or coho salmon become listed during the life of the proposed project, this BA could be used to aid the Corps during any subsequent Section 7 consultation with NMFS related to these species.

Golden paintbrush (*Castilleja levisecta*), Willamette daisy (*Erigeron decumbens* var. *decumbens*), Bradshaw's lomatium (*Lomatium bradshawii*), Kincaid's lupine (*Lupinus sulphureus* var. *kincaidii*), and Nelson's checker-mallow (*Sidalcea nelsoniana*) are species listed as threatened or endangered but are not addressed in this BA because the habitats required by these species are not within the action area (Federal Register Vol. 58, No. 28; Vol. 62, No. 112; and Vol. 65, No. 16).

2.0 PROJECT DESCRIPTION

2.1 PROJECT AND ACTION AREAS

The "project area" is defined as Berths 4 and 5 at the International Terminals site on the Willamette River at Section 35, Township 2N, Range 1W (Figure 1). Photographs of the project area are in Appendix B.

The "action area" for fish resources is defined as the area potentially impacted by maintenance dredging activities. Therefore the action area is defines as the dredging area plus an additional 500 feet riverward, 1,000 feet upstream and 1,000 feet downstream of the dredging area. The "action area" for avian species is defined as a one-mile radius around the project area.

2.2 PROPOSED ACTION DESCRIPTION

SSI proposes to conduct maintenance dredging of Berths 4 and 5 at the International Terminals site to maintain safe navigation access and berthing for the dock facilities by conducting periodic maintenance dredging as needed. The berths have been maintained under previous maintenance dredging permits (US Army Corps of Engineers Section 10/404 Permit #92-00812 and Oregon Division of State Lands Removal-Fill Permit No. 3701). The site is designated for marine industrial use by the Lower Willamette River Management Plan, which recognizes the need to protect and fully use the limited areas of Portland Harbor so designated. Over the past three decades, the site has been primarily used to support metal recycling and vessel dismantling operations, as well as temporary moorage.

The project involves dredging the area to a maximum depth of –36 to –42 feet Columbia River Datum (CRD) (Figures 2 and 3). The proposed dredge footprint covers about 6.6 acres with a length

of about 1600 feet and a maximum width of 220 feet. The initial dredge volume associated with the proposed dredge prism is 61,000 cubic yards (cy).

SSI proposes to dredge another 40,000 cy as needed for ongoing maintenance (e.g. 20,000 cy every other year on average in years two through five, based on a five-year permit as shown in Table 1). Dredging will be by clamshell bucket, with transport to approved upland facilities or locations by barge, truck or rail. Factors such as bucket impact, penetration, withdrawal, and dewatering have been identified as contributing to the resuspension of sediment during clamshell dredge operation (e.g., Hayes et al. 1988). Most of the dewatering will occur as the clamshell excavates and transfers the individual load, which occurs with all dredging operations. The material will have high water content, and some release is expected. The rate at which suspended sediments settle back to the bottom is generally exponential with rapid declines within 200 to 400 feet (Collins 1995). Because of this rapid resettlement, it is anticipated that the area experiencing higher turbidity levels would be relatively small.

The proposed action (i.e. maintenance dredging of an existing facility using a clamshell bucket) and site conditions (see Section 3.0) are consistent with the conditions specified in the *Programmatic Biological Assessment for Categories of Activities Requiring Department of the Army Permits* (Corps 2000b) and NMFS biological opinion of the programmatic BA (NMFS 2002).

2.3 CONSERVATION MEASURES

Construction would occur during times when chinook and chum salmon and steelhead trout are least likely to be present in the action area. All in-water work is scheduled for the in-water work window for the Willamette River (from July 1 through October 1 and December 1 through January 31). However, the urgency of the initial dredge and the permitting time frame may require some work during the regularly scheduled closure to allow completion of the initial dredge. Some construction may occur during the bald-eagle wintering season (October 31 – February 31).

In addition to timing in-water work to avoid the juvenile migration period, SSI proposes to use best management practices during maintenance dredging as outlined in NMFS (2002) and the Corps Nationwide Permit for maintenance dredging to protect water quality and benthic resources. The proposed dredging will provide one foot of advanced maintenance (already accounted for in the maximum proposed dredge depths) to minimize maintenance dredging events.

3.0 EXISTING ENVIRONMENTAL CONDITIONS AND EFFECTS OF THE ACTION

This section discusses existing environmental conditions and any temporary and permanent effects of project activities (Section 2.2), as well as the net effects of those activities (Table 2). It discusses only those environmental attributes and associated components of habitat quality that are important to the listed species addressed, and that are likely to be affected by the project in some way.

3.1 GENERAL

3.1.1 Existing Conditions

Approximately half of the Lower Willamette River flows through forested areas, one third through agricultural areas, and five percent through urban areas, such as Portland. The International Terminals site is located at river mile (RM) 3.6 in Portland. Land use surrounding the site is primarily industrial, and riverbanks have been heavily modified with riprap or bulkheads. Berths 4 and 5 are located in the Willamette River. The site was originally developed in the early 1940's for military ship construction. Berth 4 is currently used to export bulk metal products with a conveyor system. Berth 5 has a floating dock with a crane and is used for temporary moorage.

3.1.2 Effects of the Action

The proposed project will not result in increased boat traffic or associated noise.

A clamshell dredge will be used for the proposed project. Increased noise from dredging may cause salmonids, other fish species, and bald eagles to avoid the area during construction. Clamshell buckets are not expected to entrain juvenile, sub-adult, or adult salmonids, but may entrain demersal fish and epibenthic invertebrates.

Results of studies on the effects of waterborne sound on fish behavior have been ambiguous and do not allow for prediction of responses (Popper and Carlson 1998). The level at which fish can detect sound depends upon the level of background noise. Sound must be at least 10 dB more intense than background noise to avoid being masked by ambient noise at the same or nearby frequencies (Tavolga 1971). Popper and Carlson (1998) note that the effects of noise depend greatly on the flow field in which the noise occurs. The level of ambient or background noise can drastically reduce a fish's ability to detect other sounds. Wind and precipitation at the surface, water turbulence, animal sounds, human activity and many other factors create significant levels of underwater noise with or without ice cover (ICES 1994, Richardson et al. 1995, and H. Cleator, pers. com. as in Stewart 2001). Since most background noise is within the hearing range of fishes, the noise generated by

background conditions and river flows adjacent to the project area will probably modify the reaction of fish to noise generated by the project

Above-water noise and movement of machinery at the site are much more likely to frighten away fish predators such as kingfishers, herons, grebes, and mergansers, than in-water noise is to frighten fish into areas where they might be more vulnerable to predators such as native char, cutthroat trout, and juvenile coho salmon.

Proposed maintenance dredging will allow present operations to continue, and noise generated will not differ much from existing operations at this site and many other sites along the Willamette River. Because the primary noise sources will be about 50 feet from shore, smaller juvenile salmonids moving along the shoreline would likely remain nearshore, rather than moving offshore toward the noise. Fish traveling downstream in the channel would avoid moving barges and tugs by moving away from the vessel path and diving deeper. Because of expected low densities of potential fish predators on juvenile salmonids in mid-channel, this short-term avoidance behavior is unlikely to result in increased predation losses.

3.2 WATER QUALITY AND STORMWATER

3.2.1 Existing Conditions

Urbanization has reduced water quality in the area via direct inputs of municipal and industrial discharges and indirect inputs from agricultural, silvicultural, urban, and industrial land. The Willamette River is currently on the 1998 Oregon Department of Environmental Quality (ODEQ) 303d list as impaired for temperature, bacteria, biological criteria, and toxics. However, ODEQ has been monitoring water quality in the Lower Willamette basin since 1986 with special intensive studies in the Tualatin and Lower Willamette subbasins in 1986-1990. These studies show that water quality in the Lower Willamette Basin has improved significantly (Cude 2003).

3.2.2 Effects of the Action

Because the proposed maintenance dredging will not increase impervious surfaces, stormwater runoff will not increase. The proposed maintenance dredging will not increase boat traffic, so the chance of water quality degradation from pollution from boats will not increase.

The proposed maintenance dredging will cause temporary and localized impacts on water quality in the vicinity of active dredging. Turbidity will increase slightly in a limited mixing zone downstream of active work areas. Elevated turbidity plumes that may occur in localized areas near active dredging should be dissipated relatively rapidly by tidal and river currents (e.g., FSI et al. 1999).

In-water work will be conducted during periods when few if any juvenile anadromous fish will be present.

Juvenile salmon have been shown to avoid areas of high turbidities (e.g., Servizi 1988), although they may seek out areas of moderate turbidity (10 to 80 nephelometric turbidity units [NTU]), presumably as cover against predation (Cyrus and Blaber 1987a,b). Feeding efficiency of juveniles is also impaired by turbidities over 70 NTU, well below sub-lethal stress levels (Bisson and Bilby 1982). Reduced preference by adult salmon homing to spawning areas has been demonstrated where turbidities exceed 30 NTU (20 mg/L suspended sediments). However, chinook salmon exposed to 650 mg/L of suspended volcanic ash were still able to find their natal water (Whitman et al. 1982). Based on these data, it is unlikely that the locally elevated turbidities generated by the proposed action would directly affect juvenile or adult salmonids that may be present.

Short-term effects from increased turbidity are expected during dredging, but these effects from sediment resuspension should be only temporary. Dredging is not expected to result in any long-term adverse changes in levels of chemical contamination, temperature, or dissolved oxygen. Therefore, the net effects of dredging will be to maintain water quality in the project area.

3.3 FLOW AND CURRENT PATTERNS

3.3.1 Existing Conditions

Flows in the Willamette River are controlled by 13 impoundments on several of its larger tributaries and by the Willamette Falls at RM 26.5. Below the falls, the Willamette River is tidally influenced by the Pacific Ocean a hundred miles to the west (Corps 2000a) as well as flow conditions in the Columbia River. The width of the Willamette River at the project site is approximately 1700 feet wide during typical river flows with maximum depths of approximately –50 feet to –60 feet CRD in the vicinity of berths 4 and 5 at International Terminals.

3.3.2 Effects of the Action

The proposed maintenance dredging is not expected to alter flow or current patterns of the river since the proposed changes in the bathymetry are minor in relation to the cross sectional area of the river at this location.

3.4 SEDIMENTS, SUBSTRATE, AND BATHEMETRY

3.4.1 Existing Conditions

Currently the depth within the existing berths ranges from –22 feet CRD to –51 feet CRD. Dredging will change these depths to –36 feet CRD in berth 5 and –42 feet CRD in berth 4. Dredging will remove 61,000 cy of sediment in the first year of the permit, followed by an additional 20,000 cy every other year on average over the remainder of the permit duration. The sediments exposed by dredging are expected to be similar to surficial sediments present throughout the project area.

MCS collected two sediment cores in the berths during March 2003 and Floyd Snider McCarthy, Inc. evaluated them using the analyte list suggested in the Dredged Material Evaluation Framework (DMEF) (Corps 1998). Data were compared to the DMEF values, probable effects concentration (PEC) values for freshwater sediment quality developed by MacDonald et al. (2000) and Ingersoll et al. (2000), and Portland Harbor Area-Wide Sediment baseline values (ODEQ 1999).

In general, there were very few DMEF screening level exceedances (5 total) and these occurred only in surface composites. Samples considered representative of the post-dredge surface were largely devoid of detections and when detects occurred, they were many times below screening levels. Although one surface composite had PEC exceedances for 3 PAHs, no exceedances occurred at the representative post-dredge depth. Additionally, all exceedances are within the Portland Harbor Area-Wide Sediment baseline values (PSMI 2003).

3.4.2 Effects of the Action

Maintenance dredging in the project area should maintain sediment quality. Dredging will not affect sedimentation sources or rates. Because most of the sediments do not contain contaminants above DMEF screening levels, resuspension of sediments is not expected to release contaminants into the water column.

Shallow water habitat (< 20 feet in water depth) provides food resources and migration routes for juvenile salmonids (Simenstad et al. 1999). Salmonid habitat may suffer a minor net decline in function due to the deepening. The proposed dredging will create steeper slopes along the edge of the dredge area and deepen the dredge area. However, 76% percent of the initial dredge prism lies below an existing mudline elevation of –20 feet CRD. In subsequent years of the permit it is expected that almost all the dredging will occur below existing mudline elevations of –20 feet CRD. Other than approximately 1.6 acres of dredging area in the first year of the permit all the remainder of the proposed dredging is expected to be at depths below –20 feet CRD (i.e. the lower limit of shallow water habitat). The contribution of epibenthic prey to salmonids from the small subtidal area to be dredged should be limited by the depths within the proposed dredge prism. The adjacent

Willamette River channel and associated shallow-water areas are much larger than the area being dredged, so no adverse impact is anticipated on salmonids foraging on benthic invertebrates in the spring following dredging. By the spring outmigration period after dredging, the productivity of epibenthic prey for juvenile salmonids should be recovering, but may be less than the ultimate production of the area after a 1- to 2-year recolonization period. Because of the limited area of dredging in depths preferred by foraging salmonids and the rapid recolonization of benthic and epibenthic biota, the proposed dredging is not expected to have any short- or long-term direct effects on the juvenile salmonid foraging habitat.

No known spawning habitat exists within the action area, therefore any potential temporary suspension of sediments is not expected to embed spawning gravels.

3.5 SHORELINE CONDITIONS

3.5.1 Existing Conditions

Historically the Willamette Falls was an impassible fish barrier to many salmonids until fish ladders were constructed in the early 1900s. Berths 4 and 5 do not hinder fish access in the Willamette River.

Riparian vegetation has been greatly altered in the Lower Willamette River Basin. Little to no riparian vegetation exists in the action area along the eastern shore of the Willamette River or in the International Terminals site. However, riparian vegetation cover a large area along the western shore of the Willamette across from the slip at Forest Park. Black cottonwood (*Populus balsamifera* ssp. *trichocarpa*), Oregon white ash (*Fraxinus latifolia*), red alder (*Alnus rubra*), and willow (*Salix* spp.) are typical trees species along the Willamette River. Typical shrub species include Himalayan blackberry (*Rubus discolor*) and Scotch broom (*Cytisus scoparius*).

3.5.2 Effects of the Action

Temporary increases in noise or turbidity from dredging activities may prevent access and refuge for salmonids and other species in the immediate vicinity of the work areas (see Sections 3.1 and 3.2).

The proposed dredging will occur below -1 feet CRD and therefore will not affect the shoreline or riparian habitat.

3.6 ACCESS AND REFUGIA

3.6.1 Existing Conditions

The International Terminals slip could provide refuge for salmonids during periods of high flow.

3.6.2 Effects of the Action

Temporary increases in noise or turbidity from dredging may prevent access and refuge for salmonids and other species in the immediate vicinity of the work areas during the period of dredging activity (see Sections 3.1 and 3.2).

3.7 BIOTA CONDITIONS

3.7.1 Existing Conditions

Benthic and epibenthic organisms in the Lower Willamette River basin include oligochaetes, mysid shrimp, amphipods, chironomid larvae, crayfish, and mollusks (Sanborn 1973 and FES 1995). Fish species include salmonids, largescale sucker (*Catostomus macrocheilus*), northern pikeminnow (*Ptychocheilus oregonesis*), perch (*Cymatogaster aggregate*), peamouth (*Mylocheilus caurinus*), sculpin (Cottidae), bluegill (*Lepomis macrochirus*), threespine stickleback (*Gasterosteus aculeatus*), and sturgeon (*Acipenser* spp.) (FES 1999).

3.7.2 Effects of the Action

Dredging will eliminate nonmobile benthos over approximately 6.6 acres of the bottom in the project area, temporarily reducing abundance and diversity. The newly exposed bottom should be quickly recolonized by infauna and epifauna (McCauley et al. 1977; Richardson et al. 1977; Romberg et al. 1995; Wilson and Romberg 1995). Diversity and health of the benthic assemblage recolonizing the dredged area should recover quickly and be similar to those of the subtidal benthic community now present. Areas adjacent to the project site will provide local larval sources for recolonization. Because of the prolonged period of planktonic larval development (several days to weeks) for most benthic species, currents will likely carry most larvae into the project area from plankton spawning outside of it.

By the spring outmigration period after dredging, the productivity of epibenthic prey for juvenile salmonids should be recovering, but may be less than the ultimate production of the area after a 1- to 2-year recolonization period. The contribution of epibenthic prey from the small subtidal area to be dredged is limited by the area's depth. Because the adjacent Willamette River and associated

shallow-water areas are so much larger than the area to be dredged, dredging should not harm salmonids foraging on benthic invertebrates.

Repeated disturbance from current use of the action area reduces ecological diversity. Proposed dredging will not increase this disturbance and therefore is not expected to have short-term direct effects on ecological diversity in the project area.

Avian species that now use the action area or that fly over it during dredging may modify their use of the area, moving away from construction activity.

Proposed dredging will not have short-term direct effects on aquatic vegetation within the project area because there are no known macroalgae beds there.

Proposed dredging will not have short-term direct effects on the pelagic prey in the project area because it will not degrade water quality enough to affect pelagic assemblages.

4.0 EVALUATION OF EFFECTS ON LISTED SPECIES

This section discusses life histories of listed species and the use of the action area. It evaluates temporary and permanent, direct and indirect effects on listed species from project activities (Section 2.2) and includes the effects determination. Detailed life histories are discussed in Corps 2000b. This section discusses only attributes of listed species that are likely to be affected by the project in some way.

An analysis of effects on Essential Fish Habitat (EFH) under the Magnuson-Stevens Fishery and Conservation Act is described in Appendix C.

4.1 LOWER COLUMBIA AND UPPER WILLAMETTE CHINOOK

4.1.1 Life History and Critical Habitat

Chinook salmon prefer to spawn and rear in the mainstem of rivers and larger streams. Although water temperatures determine the incubation period, fry typically hatch in about eight weeks. After emergence, juvenile chinook salmon migrate to saltwater during their first year (Corps 2000b).

Critical habitat is currently being reconsidered for Lower Columbia and Upper Willamette chinook. On April 30, 2002, the US District Court for the District of Columbia approved a NMFS consent decree withdrawing a February 2000 critical-habitat designation for these and 17 other evolutionary significant units (ESUs) (NMFS 2000). Critical habitat consists of the water, substrate, and adjacent riparian zone of accessible estuarine and riverine reaches.

4.1.2 Use of the Action Area

Most chinook in the project area are likely to be migrating juveniles and adults. Juvenile chinook feed on benthic and epibenthic organisms in shallow nearshore areas. Adult chinook typically feed on other fish such as whitefish, sculpin and other trout. Therefore, adult chinook in the action area would likely be feeding on fish in the deeper water of the action area rather than the benthic and epibenthic organisms that are primary prey for juveniles.

4.1.3 Effects of the Action

No direct mortality of chinook is expected from any aspect of project construction, which will occur when few, if any, juvenile salmonids are present. Adult and juvenile chinook can avoid any proposed project conditions that would result in direct impacts (e.g. entrainment in the bucket) on them. Dredging will likely increase turbidity in the immediate vicinity. This impact will be only

temporary and the suspended sediment will dissipate quickly. Dredging will temporarily eliminate benthic organisms, an important food source for juvenile chinook. By the spring outmigration period after dredging, the productivity of epibenthic prey for juvenile salmonids should be recovering, but may be less than the ultimate production of the area after a 1- to 2-year recolonization period (McCauley et al. 1977; Richardson et al. 1977; Romberg et al. 1995; Wilson and Romberg 1995). The contribution of epibenthic prey from the small subtidal area to be dredged is limited by the area's depth. Because the adjacent Willamette River and associated shallow-water areas are so much larger than the area to be dredged, dredging should not harm salmonids foraging on benthic invertebrates. Seventy six percent of the area to be dredged in the first year of the permit is below -20 feet CRD, deeper than migrating juveniles prefer (Simenstad et al. 1999). In subsequent years of the permit all maintenance dredging is anticipated to be below -20 feet CRD.

4.1.4 Effect Determination

Because of the lack of significant water quality impacts, and the short-term, localized nature of any reductions in prey abundance, the proposed project may affect, but is not likely to adversely affect chinook.

4.2 COLUMBIA RIVER CHUM SALMON

4.2.1 Life History and Critical Habitat

Chum salmon prefer to spawn at the head of the tidewater. Although the incubation period is determined by water temperatures, fry hatch in two weeks to four months. After emerging from the gravel, fry migrate immediately to marine waters, limiting their freshwater life history to a few days. Rearing and development to adulthood occur in the marine environment (Corps 2000b).

Critical habitat is currently under development for Columbia River chum following the NMFS consent decree withdrawing critical habitat designation for this and 18 other ESUs (NMFS 2000).

4.2.2 Use of the Action Area

Like chinook salmon, the majority of chum that occur within the project area are likely to be migrating juveniles and adults. Therefore, chum in the action area may be feeding on epibenthic organisms in the action areas as well as on pelagic organisms in water deeper than the action area.

4.2.3 Effects of the Action

The effects of the proposed action on chum would be similar to those described for chinook. However, unlike juvenile chinook, juvenile chum may not feed while migrating to saltwater.

Therefore, the impacts on epibenthic prey from construction may affect chum even less than the other listed salmonids.

4.2.4 Effect Determination

Because of the lack of significant water quality impacts, and the short-term, localized nature of any reductions in prey abundance, the proposed project may affect, but is not likely to adversely affect chum salmon.

4.3 LOWER COLUMBIA RIVER AND UPPER WILLAMETTE STEELHEAD TROUT

4.3.1 Life History and Critical Habitat

Steelhead trout spawn in tributaries of small and large rivers in late winter through spring. Juveniles migrate to the ocean after rearing in large rivers for one to four years. Steelhead spend one to three years in the ocean before returning to their natal streams to spawn. Unlike most anadromous salmonids, steelhead trout may return to their natal streams several times to spawn before they die (Corps 2000b).

Critical habitat has not been designated for steelhead trout (NMFS 2000).

4.3.2 Use of the Action Area

Juveniles, sub-adult, or adult steelhead trout may occur within the project area. Adult and sub-adult steelhead trout are typically piscivores, feeding on other fish such as whitefish, sculpin and other trout. Therefore, the adult and sub-adult steelhead trout in the action area would likely be feeding in the deeper water of the action area on fish rather than the insects that are primary prey for juveniles.

4.3.3 Effects of the Action

No direct mortality of steelhead trout is expected from any aspect of project construction, which will occur when few, if any, juvenile salmonids are present. Adult and juvenile steelhead trout can avoid any proposed project conditions that would result in direct impacts (e.g. entrainment in the bucket) on them. Dredging will likely increase turbidity temporarily in the immediate vicinity. Suspended sediment will dissipate quickly.

Dredging will eliminate benthic organisms, an important food source for juvenile steelhead trout. By the spring outmigration period after dredging, the productivity of epibenthic prey for juvenile salmonids should be recovering, but may be less than the ultimate production of the area after a 1- to 2-year recolonization period (McCauley et al. 1977; Richardson et al. 1977; Romberg et al. 1995;

Wilson and Romberg 1995). The contribution of epibenthic prey from the small subtidal area to be dredged is limited by the area's depth. Because the adjacent Willamette River and associated shallow-water areas are so much larger than the area to be dredged, dredging should not harm salmonids foraging on benthic invertebrates. Seventy six percent of the area to be dredged is below -20 feet CRD, deeper than foraging juveniles prefer (Simenstad et al 1999). In subsequent years of the permit all maintenance dredging is anticipated to be below –20 feet CRD.

4.3.4 Effect Determination

Because of the lack of significant water quality impacts, and the short-term, localized nature of any reductions in prey abundance, the proposed project may affect, but is not likely to adversely affect steelhead trout.

4.4 BALD EAGLE

4.4.1 Life History and Critical Habitat

In Oregon, bald eagle breeding territories are mainly located in coniferous, uneven-aged stands with old-growth components. A variety of habitat characteristics influence territory size and configuration, including availability and location of perch trees for foraging, quality of foraging habitat, and distance of nests from waters supporting adequate food supplies. Bald eagles typically build nests in old-growth trees, which are generally used in successive years. Courtship and nest-building begin in January and February. Egg laying begins in March or early April, and eaglets hatch in mid-April or early May. They fledge in mid-July and often remain in the vicinity of the nest for another month (Rodrick and Milner 1991; Corps 2000b).

Eagles often depend on dead or weakened prey, and their diet may vary locally and seasonally. During the breeding season they eat anadromous and warmwater fishes, small mammals, carrion, small waterfowl, and seabirds. Various carrion, including spawned-out salmon, are important food sources during fall and winter (Rodrick and Milner 1991).

Critical habitat has not been designated for bald eagles.

4.4.2 Use of the Action Area

A species list obtained from the USFWS indicates that bald eagles may occur in the vicinity of the proposed project. No bald eagle nests are located in the action area. The closest nests are more than three 3 miles north and northwest of it (G. Dorsey, pers. comm., June 5, 2003).

The availability of suitable nest trees is often a limiting factor in the establishment of eagle territories (Carroll and Pentec 1992). Although there are no large trees in the action area for the bald eagles to roost or nest in, bald eagles occasionally fly over the area and may rest or perch on nearby pilings or cottonwood trees.

4.4.3 Effects of the Action

Construction could occur during the nesting season. However, since it would be more than 3 miles from the closest bald eagle nests, construction would not directly disrupt eagle nesting and rearing of young. No communal night roosts or perch trees are near the site, so wintering bald eagles would not be affected by construction that may occur during the wintering season. Foraging bald eagles may be displaced by the noise of heavy equipment, but the availability of prey would not be significantly disrupted by the proposed maintenance work. Given the surrounding urbanization and industrialization, eagles using the area are likely accustomed to high levels of human activity in the action area.

4.4.4 Effect Determination

Dredging will not affect nesting or wintering habitat or behaviors, and only minor disruptions to foraging may occur, so the proposed project may affect, but is not likely to adversely affect the bald eagle.

4.5 WATER HOWELLIA

4.5.1 Life History and Critical Habitat

Water howellia has historically occurred over a large area of the Pacific Northwest. Water howellia occurs in vernal ponds and shallow water edges of larger ponds, oxboughs, sloughs, or other slow-moving water bodies with fine sediment.

Critical habitat has not been designated for water howellia (Corps 2000b).

4.5.2 Use of the Action Area

There are no records of water howellia occurring in the action area and there is no habitat capable of supporting it there. Shallow-water areas in the action area are covered with riprap and do not contain the fine sediment preferred by water howellia. Additionally, boat traffic is likely to create sufficient wave action in the area to prevent establishment of water howellia, even if suitable substrate existed between riprap boulders.

4.5.3 Effects of the Action

Because water howellia is not known to exist in the action area and the action area does not contain habitat suitable for water howellia, dredging activities will not affect water howellia.

4.5.4 Effect Determination

Dredging activities will not affect potential water howellia habitat, as dredging will occur in water deeper than water howellia can tolerate. In addition, there is no suitable water howellia habitat in the action area. Thus the proposed project will have no effect on water howellia.

4.6 COASTAL CUTTHROAT TROUT

4.6.1 Life History and Critical Habitat

Coastal cutthroat trout spawn in small tributaries of small and large rivers in late winter through spring. Juveniles migrate downstream between March and June and may make several freshwater migrations before migrating to the ocean. Most coastal cutthroat trout are 2 to 3 years old before migrating to the ocean. Coastal cutthroat trout spend less than one year in the ocean before migrating back to their natal streams to spawn. Unlike most anadromous salmonids, coastal cutthroat trout do not die after spawning (Corps 2000b).

Critical habitat has not been designated for coastal cutthroat trout (NMFS 2000).

4.6.2 Use of the Action Area

Most coastal cutthroat trout in the project area are likely to be adults and sub-adults from nearby basins. Adult and sub-adult coastal cutthroat trout typically feed on other fish such as whitefish, sculpin, and other trout. Therefore, the adult and sub-adult coastal cutthroat trout in the action area would likely be feeding in the deeper water of the action area on fish rather than the organisms that serve as primary prey for juveniles.

4.6.3 Effects of the Action

No direct effect on coastal cutthroat trout is expected to result from any aspect of project construction, which will occur when few, if any, juvenile salmonids are present. Adult salmonids can avoid any conditions that would result in direct impacts (e.g. entrainment in the bucket) on them. Dredging will likely increase turbidity temporarily in the immediate vicinity. Suspended sediment will dissipate quickly.

Dredging will eliminate benthic organisms, an important food source for juvenile coastal cutthroat trout. By the spring outmigration period after dredging, the productivity of epibenthic prey for juvenile salmonids should be recovering, but may be less than the ultimate production of the area after a 1- to 2-year recolonization period (McCauley et al. 1977; Richardson et al. 1977; Romberg et al. 1995; Wilson and Romberg 1995). The contribution of epibenthic prey from the small subtidal area to be dredged is limited by the area's depth. Because the adjacent Willamette River and associated shallow-water areas are so much larger than the area to be dredged, dredging should not harm salmonids foraging on benthic invertebrates. Additionally, seventy six percent of the area to be dredged is below –20 feet CRD, deeper than foraging juveniles prefer (Simenstad et al. 1999). In subsequent years of the permit all maintenance dredging is anticipated to be below –20 feet CRD.

4.6.4 Effect Determination

Because of the lack of significant water quality impacts, and the short-term, localized nature of any reductions in prey abundance, the proposed project will not jeopardize coastal cutthroat trout. Should coastal cutthroat trout become listed the proposed project may affect, but is not likely to adversely affect, cutthroat trout or their habitat.

4.7 LOWER COLUMBIA RIVER COHO SALMON

4.7.1 Life History and Critical Habitat

Coho spawn in small tributaries of small or large rivers in late winter through spring. Juveniles migrate downstream between April and August. Juvenile coho may spend anywhere from a few weeks to two years in freshwater before migrating to the ocean. Coho spend one to two years in the ocean before migrating back to their natal streams to spawn (Corps 2000b).

Critical habitat has not been designated for Lower Columbia River coho salmon.

4.7.2 Use of the Action Area

Most coho in the project area are likely to be adults and sub–adults from nearby basins. Adult and sub–adult coho typically feed on other fish such as whitefish, sculpin, and other trout. By the time adult coho reach the Willamette River, they probably are not feeding. Sub–adult coho in the action area would likely be feeding in the deeper water of the action area on fish rather than the benthic and epibenthic organisms that serve as primary prey for juveniles.

4.7.3 Effects of the Action

The effects of the proposed action on coho would be similar to those described for chinook. Impacts on epibenthic prey from construction could have less impact on coho than other salmonid species because coho found in the action area are likely to be less dependant on epibehtic prey than chinook.

4.7.4 Effect Determination

Because of the lack of significant water quality impacts, and the short-term, localized nature of any reductions in prey abundance, the proposed project will not jeopardize coho salmon. If coho are listed, the proposed project may affect, but is not likely to adversely affect, coho salmon or their habitat.

5.0 INTERRELATED, INTERDEPENDENT, AND CUMULATIVE EFFECTS

Cumulative effects are those effects of future state or private activities, not involving activities of other federal agencies that are reasonably certain to occur within the area of the federal action subject to consultation (50 CFR 402.02 Definitions). Future federal actions unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to Section 7 of the ESA. Interdependent effects are defined as actions with no independent utility apart from the proposed action. Interrelated effects include those that are part of a larger action and depend on the larger action for justification.

No interdependent or cumulative effects are known to occur that may adversely affect a listed, proposed, or candidate species within the action area. An interrelated action of the proposed action may be the occasional disturbance of the substrate from prop wash of tugs as they bring in barges or during the hauling out of barges or other vessels. Prop wash could result in small, temporary increases in turbidity. The periodic disturbance of the substrate caused by the prop wash could reduce the suitability of the substrate for colonization by benthic macroinvertebrates utilized as food by juvenile salmonids. However, these effects of prop wash being localized and temporary would have little affect on the growth or survival of juvenile salmonids.

6.0 SUMMARY

Construction activities would temporarily increase noise and turbidity, possibly causing listed species to avoid the immediate work area. Best management practices would be used to reduce these impacts. Thus, the proposed action:

- **may affect, but is not likely to adversely affect** chinook salmon,
- **may affect, but is not likely to adversely affect** chum salmon,
- **may affect, but is not likely to adversely affect** steelhead trout,
- **may affect, but is not likely to adversely affect** bald eagles, and
- will have **no effect** on water howellia.

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DEPARTMENT
ENVIRONMEN
QUALITY

WATER QUALITY 401 CERTIFICATION
Public Notice

WHO IS THE APPLICANT: See the attached Department of State Lands (DSL) and or Corps of Engineers (COE) permit application.

WHAT IS PROPOSED: See the attached DSL and or COE permit application on the proposed project.

DESCRIPTION OF DISCHARGES: See the attached DSL and or COE permit for details.

NEED FOR CERTIFICATION: Under Section 401 of the Clean Water Act, any activity that requires a federal permit or license requires certification from the State that any discharge will meet the requirements of the Clean Water Act and State water quality standards. . .

PUBLIC PARTICIPATION: Written comments must be received by 5 p.m. no later than thirty days from the notice issued date at the Oregon Department of Environmental Quality, Water Quality Division, 811 S.W. 6th Ave., Portland, Oregon 97204 to be included in the official record. Public comments should specifically include new data addressing how the project would affect requirements of the Clean Water Act and Oregon water quality standards.

The applicant, any affected state, or any interested agency, person or group of persons, may request a publi hearing with respect to this certification application. If the Director determines new data would be produced a public hearing will be held prior to the director's final determination. There shall be notification of such a hearing.

HOW TO GET ADDITIONAL INFORMATION: The application and related documents are available for inspection during the public comment period, Monday through Friday, between 9:00 am to noon and 1:00 pm to 4:00 pm at DEQ's Portland office. Please call in advance for an appointment 229-5279.

People wishing to receive a copy of the DSL/COE application can call DEQ at (503) 229-5279 or toll free in Oregon at 1-800-452-4011. Public Records Act charges may apply. Persons with a hearing impairment ca receive help by calling DEQ's TDD number at (503) 229-6993.

WHAT HAPPENS NEXT: After the conclusion of the public participation period, the permit will be issued a proposed, issued with modifications, or denied, depending on comments received during the public participation process. Interested parties can request to be notified of the final determination by writing or calling the Department at the above address.

ACCESSIBILITY INFORMATION: This publication is available in alternate format (e.g. large print, braille) upon request. Please contact Ed Sale in DEQ Public Affairs at 229-5766 to request an alternate format.

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APPENDIX C – SEDIMENT DATA REPORT

International Terminal Sediment Data Report

Prepared for

SCHNITZER STEEL INDUSTRIES, INC

Prepared by

Floyd Snider McCarthy, Inc.
83 South King Street
Suite 614
Seattle, Washington 98104

June 26, 2003

Final

Table of Contents

Tables

Figures

Appendices

1.0 Introduction

Schnitzer Steel Industries, Inc. (Schnitzer) operates the Burgard Industrial Yard located near the 12000 block of North Burgard Road in north Portland, Oregon. The International Terminals (IT) slip and associated berths are located adjacent to the Burgard Industrial Yard. The property was originally developed as a shipyard in 1939 and 1940. For the last three decades the slip has supported commercial marine repair, fabrication, construction and dismantling services. Currently these berths support metal recycling operations as well as barge and ship dismantling operations. These berths are also used to import bulk cargo such as manganese, pig iron, steel coils and steel slabs.

The slip contains three berths and 1,680 feet of docking facilities. Berths 1 through 3 are located within the International Terminals slip (IT Slip) adjacent to the Burgard Yard. Berths 4 and 5 are located on the river side of facility. The slip and associated berths are an existing facility and have been maintained under previous maintenance dredging permits (U.S. Army Corps of Engineers Section 10/404 Permit #199100099 and Oregon Division of State Lands Removal-Fill Permit No. 1055).

Due to shoaling at the mouth of the slip and within the berths, there is a critical and urgent need to perform maintenance dredging for these facilities. In the fall of 2002 an incoming ship was required to dock and offload several thousand tons of cargo prior to arrival at the IT Slip to prevent grounding. Subsequent to that event, a meeting was held with the Columbia River Pilots (Pilots) to determine the minimum acceptable conditions needed for safe navigation access and berthing in the slip given the draft, length, and width of vessels that are expected use this facility over the next five years. The proposed dredge prisms were developed based on the suggestions from the Pilots in addition to other engineering considerations such as slope stability.

In anticipation of maintenance dredging, sediment sampling was performed from March 11 through March 13, 2003. Due to a lack of available data on sediment quality, this advance sediment sampling was necessary to aid in dredge design considerations. It was also necessary to gather additional sediment data to characterize sediment quality for the proposed dredging. Data obtained from this sampling event was used to evaluate sediment quality consistent with the guidance found in the Dredged Material Evaluation Framework (DMEF) (USACE 1998).

The purposes of this sampling and analyses project include:

- Provide sediment quality data to allow refinement of dredge design so that the post-dredge surface will be acceptable.
- Assess the appropriateness of DMEF Site Ranking for this project.
- Provide data to support a joint federal and state permit application with acceptable dredge design and site ranking.

2.0 Methods

2.1 CORE COLLECTION PROCEDURES

Sediment sampling was conducted on March 11, 12, and 13, 2003, with mobilization on March 10th and demobilization on March 14, 2003. Sediment cores were taken from six locations along the riverfront and within the IT Slip. Core coordinates are listed in Table 2.1, core locations are shown on Figure 2.1. Cores SDC-SS01 and SDC-SS02 are located within Berths 4 and 5. Cores SDC-SS03 through SDC-SS06 are located within the IT Slip.

Sediment core locations were determined by differential GPS (DGPS) methods relative to Oregon State Plane North Zone North American Datum 1927 (NAD27). Elevations during sampling were determined by reading a surveyed tide gauge immediately prior to sampling. The tide gauge is located at Terminal 4 (adjacent to the IT Slip) and reads in Columbia River Datum (CRD).

Cores were taken with a *MudMole*™ pneumatic core sampler. The sampler consists of a square 4-inch aluminum core tube attached to a pneumatic-powered driving assembly with a quick-release pin. Core tubes 21 feet in length were used at all sampling locations. The tubes were cleaned before fieldwork was initiated and the ends were sealed to prevent contamination. Because core tubes are single-use, these measures minimized recontamination risks that can occur when sampling equipment is reused for multiple locations.

The *MudMole*™ pneumatic core samplers were driven into the sediment with a linear pneumatic hammer that delivers approximately 300 blows per minute. The bottom of each core tube is fitted with a hinged core catcher to prevent loss of sediment during extraction. Air to operate the pneumatic corer is provided by an industrial air compressor located on the deck of the sampling vessel. The sampler was operated by personnel on the sampling vessel in shallow waters and by a diver in deeper waters.

After reaching the selected sampling location, the core sampler was lowered to the bottom using a winch. The operator turned on the air hammer once the core tube entered the sediment. At approximately 2-foot intervals, the operator suspended the driving operation and measured the penetration and recovery of the core. Internal recovery was measured by lowering a weighted tape measure inside the core tube until the weight contacted the surface of the sediment. The penetration of the core tube was then measured using a second tape measure and reference marks on the outside of the core tube. Internal recovery and penetration information was recorded during the drilling operation. After driving the core to the desired depth (or until refusal), the air hammer was turned off and a final set of penetration and recovery measurements was taken. The actual sampling position was logged and a lifting winch was used to extract the core.

After the core was extracted, the distance from the top of the core tube to the surface of the sediment was measured on-deck to account for any movement or loss of sediment in the core tube. This top-of-sediment measurement along with the paired penetration and recovery

measurements was used to account for thinning and compaction of the sediments during driving, and was entered into a spreadsheet program to generate a bore log (Appendix A).

A single core was collected and sampled at each sampling station. Cores were driven to the proposed sample depth or until refusal. If penetration or recovery was insufficient to meet the study needs, a second and sometimes third attempt was made to obtain a satisfactory core.

2.2 SAMPLE COLLECTION

Cores were processed immediately upon collection. Unprocessed cores held more than 4 hours were chilled with ice.

Core-tubes were processed at an upland staging area within 8 hours of extraction. Cores that remained unprocessed 4 hours after sampling were stored on ice. Cores were transported and stored horizontally, and one core was processed and handled at a time. The core tubes were placed on sawhorses and oriented with the hinged side of the core catcher on the bottom. The uppermost side of the core tube was removed using a small saw. The depth of the cut on the saw was set to just slightly greater than the wall thickness of the aluminum tube. Approximately 1 cm (0.38 inch) of sediment was removed from the exposed sediment surface with a decontaminated stainless steel scraper. The surface layer of sediment was removed starting at the bottom of the core tube and moving toward the top to minimize the potential contamination of clean, deeper layers with material from shallower, potentially more contaminated layers.

A qualified field geologist logged each core for Universal Soil Classification and noted the presence of any soil structures, odors, or visible oil sheens. Sediment descriptions and the interpreted *in situ* depths of each sediment horizon were transcribed into a summary core log (Appendix A).

Stainless steel plates were inserted between each sampling segment, and sediment from each segment were collected from the center of the core starting at the inserted plate marking the top of a segment and extending downward until sufficient sample volume was obtained. Sediment touching the sides of the core tube was left in place, thus minimizing the potential for cross-contamination from overlying sediments. The distance down the tube was recorded to provide information on the actual collection interval for each sample.

2.2.1 Sample Processing

Samples were processed according to the scheme detailed in this section. Overall, the goal was to create two composites per core. One composite, composed of an interval from the mudline to the bottom of the proposed dredge cut, characterizes the material to be removed during maintenance dredging. The bottom composite, usually consisting of the top interval "exposed" by the proposed dredge cut plus the next lower adjacent interval, characterizes the post-dredge surface sediments. Note that the descriptions below represent targets. In some cases less material was collected due to volume considerations in core segments. However, sufficient material was collected for each core to perform required analyses.

- **Top Core Segment:** The first core segment reached from the top of the sediment to a depth corresponding to an elevation of –38 ft CRD or a depth comparable to the bottom of the proposed dredge cut for that area. A target sample volume of 2.5 liters was collected from this core segment (Section 2.2), placed in a clean stainless steel bowl and homogenized with a mechanical mixer. Alternate spoonfuls of sediment were then partitioned between four 16-ounce and two 8-ounce glass jars. The two 16-ounce and two 8-ounce jars were designated for analytical analysis; the other two 16-ounce jars were archived for 90 days at -20° C pending further analysis.
- **1-foot Core Segments:** The remaining core was sectioned into 1-foot long core segments. Approximately 1.25 liters of sediment was removed from each core segment (Section 2.2). The material from a specific core segment was homogenized in a clean stainless steel bowl, and then placed into three 8-ounce jars and one 16-ounce glass jar using alternating spoonfuls. Each of these core segments were designated by a six-digit number corresponding to the top elevation and bottom interval of the core segment. The two 8-ounce jars were designated for PAH screening analysis; the 16-ounce jar was archived at 4°C for later compositing; the third 8-ounce jar was archived for 90 days (frozen) pending further analysis or reanalysis.
- **Compositing Core Segments:** After the initial testing for PAHs (Section 2.3.1), one additional core segment was created per core at the lab by compositing the 16-ounce jars from the 1-foot core segments.

2.2.2 Sample Designations

All core samples were assigned a unique identification code. A hyphenated, alphanumeric code consisting of a media code and a location code along with interval sampling information was used for core sample designations. Format used for this project was as follows: SDC-SSXX-YYYYYY, where SDC represented sediment media of a core type. SS indicated project affiliation, and XX indicated the core number. The 6-digit sample-depth identifier YYYYYY indicated the sample interval. For example, 003004 would indicate the depth interval from 3 to 4 feet.

Core summary logs contained in Appendix A show sample identifications (located under column labeled "Primary Sample ID").

2.3 LABORATORY METHODS

Analytical testing was conducted by Columbia Analytical Services, Inc. (CAS) in Kelso, Washington.

2.3.1 PAH Screening of 1-foot Core Segments

One of the goals of this sediment characterization project is to characterize the post-dredge sediment surface quality. Information was not previously available that provided data showing depth to "native" sediments, nor was any information available that provided data showing

sediment quality changes with depth. Since PAHs can occur in both anthropogenic (combustion of petroleum products, urban run-off) and natural (forest fires) sources, PAHs can be viewed as a conservative tracer of potential sediment quality. Figure 2.2 illustrates sample intervals subject to PAH-screening analyses. Briefly, this PAH-screening involved performing EPA method 8270 (USEPA 1994) gas chromatography coupled to mass spectrophotometry and reporting only total PAHs with an urgent turnaround time.

2.3.2 Dredged Material Evaluation Framework Analytes

Analytical procedures for the chemical analysis of sediment samples collected during this investigation will include a determination of grain size, total solids, total organic carbon, metals, tributyltin, semivolatiles (organics, phthalates, phenols and miscellaneous extractables), chlorinated pesticides, chlorinated hydrocarbons and PCBs (Table 2.2). Standard USEPA sample preparation, cleanup, and analytical methods are used for these chemical analyses.

There were minor deviations from DMEF-recommended analyses for the following reasons:

- Open water disposal was not considered a likely option for these sediments.
- Landfill disposal and/or reuse of sediments as upland fill were regarded as the most likely options.
- Conventional parameters lack sediment quality criteria guidance.

Therefore, total sulfides, ammonia, and total volatile solids were not analyzed. These parameters are most relevant to open water disposal and possible tiered biological evaluations. DMEF guidance was adhered to for all other analytes.

DMEF guidance recommends quantifying tributyltin in porewater (i.e. interstitial water). However, the Weston investigation found elevated levels of organotins at station SD012, near the IT slip mouth, in sediments (i.e. solids, not porewater). Furthermore, Puget Sound studies have indicated a lack of correlation between porewater values and bioaccumulation potential (EVS 1999). Therefore, TBT was not measured in porewater, but instead was measured in sediments (solids).

2.3.3 Geotechnical Classification

Sediment samples were classified and described in accordance with the Unified Soil Classification System, as defined in ASTM D-2488-93 and D-2487-93 by a qualified field geologist.

2.4 WASTE MANAGEMENT

All sediment derived during this sampling was placed in the proper containers, labeled, and disposed of by Schnitzer in accordance with applicable regulations.

3.0 Results

3.1 CORE COLLECTION

Seven cores were collected from March 11 through March 13, 2003. Locations are shown on Figure 2.1; Table 2.1 lists station coordinates. Appendix A contains core summary logs describing the sediment types, stratigraphic contacts, and sample interval identifications for each of the cores. In general, penetration was difficult due to the density of the packed river sand. Multiple coring attempts were made at most stations.

An additional proposed station, SDC-SS07, was abandoned due to poor core recoveries. SDC-SS06 is considered representative of this area. SDC-SS03R2 was adjusted in the field to sample deeper sediments and thus "overshoot" the proposed post-dredge surface to ensure that depth to native sediment was fully understood (i.e. that another geologic layer did not occur at depth). SDC-SS04 did not reach target penetration to fully characterize the post-dredge surface but is considered representative of material to be removed.

3.2 CORE GEOLOGY

Appendix B contains extrapolated stratigraphic cross sections with core locations. In general, on the river side, layers of fine silty clay or sandy silt with thicknesses ranging from 6 to about 12 feet overlay a continuous layer of dense fine sand with trace silt. This silty clay or sandy silt may be representative of more fine-grained material deposited by the river. Within the slip berths, a similar fine sand layer is overlain by a thin silty sand or fine sandy silt layer, and then overlain by similar fine sand at the surface. The thin silty sand deposit may represent an episodic event (i.e. flood).

In general it appears that the dense fine sand represents "native" sediments since no deeper layers were detected. Furthermore, this dense fine sand is low in organic content and contains at most, only trace contaminant detections.

3.3 SEDIMENT CHEMISTRY

Appendix C contains the Chain of Custody forms for samples analyzed during this investigation.

3.3.1 Analytical Results

Table 3.1 shows results of the conventional and chemical analyses. Table 3.2 shows PAH-screening level results. Figure 2.2 shows intervals subjected to PAH-screening and subsequent composite generation.

3.3.2 Data Quality Review

A Level 1 data quality review was conducted on each analytical batch analyzed for this investigation. A summary of the data quality review is presented below; a complete review is presented in a Data Validation Report, attached as Appendix D. Sediment samples collected for chemical analysis were submitted to CAS as per method specifications.

The data quality review process includes the following steps:

- Verify that sample numbers and analyses match those requested on the chain-of-custody form
- Review sample holding time
- Verify that required reporting limits have been achieved
- Verify the accuracy of the electronic data deliverable (EDD)
- Verify that matrix spikes (MS) and lab control samples were run at the proper frequency
- Verify that surrogate compound analyses have been performed and have met quality control criteria
- Verify that MS and matrix spike duplicate (MSD) recoveries were within control limits
- Verify that lab control sample (LCR) recoveries were within control limits
- Verify that lab duplicate or triplicate sample results relative percent differences (RPD) are within control limits
- Verify that laboratory blanks are free of contaminants at or below the method reporting limits (MRL).

All data were determined to be acceptable for use, with certain qualifiers defined in the Data Validation Report and associated Table 1 (Appendix D). The data quality review is summarized briefly below; summaries are by analytical group.

3.3.2.1 Conventionals

Grain size, total solids, and total organic carbon (TOC) analyses were all acceptable. All required holding times were met. All reporting limits were met. Control samples were run at the required frequency and were within control limits. Grain size samples were frozen first for composite samples, which is not recommended under PSEP guidelines, but due to the nature of the sediments (i.e. predominantly sand), this freezing and thawing is unlikely to affect particle size distribution.

3.3.2.2 Metals

All required holding times were met. Reporting limits were slightly elevated compared to those specified by CAS. This was considered acceptable. A method blank, MS/MSDs, and LCS were

run with each batch at the required frequency. No target analytes were detected in the method blanks above the MRL.

3.3.2.3 Organics

All required holding times were met. Reporting limits were slightly elevated for two samples – SDC-SS01-000007 and SDC –SS02-000013, in part due to dilutions. Laboratory quality control analysis frequencies were acceptable. Laboratory blank results were acceptable. Surrogate recoveries were within control limits for most samples. However, due to poor surrogate recoveries for SDC-SS03R2-002004 for the base/neutral fraction, all compounds within the base/neutral fraction for this sample are either UJ flagged or J flagged. LCS recoveries were acceptable, as were matrix spike and matrix spike duplicates and MS MSD RPDs.

3.3.2.3 Pesticides

All required holding times were met. Laboratory quality control analyses frequencies were acceptable. Reporting limits were slightly elevated. Laboratory blank results were acceptable after reanalyses. Surrogate, LCS, and MS, MSD recoveries were all acceptable. MS, MSD RPDs were acceptable. For sample SDC-SS01-000007 (Aldrin) and SDC-SS01-000007, SDC-SS02-000013, and SDC-SS04-000008 (DDE), the confirmation comparison between dual columns was outside of CAS control limits and therefore were flagged with J.

3.3.2.4 PCBs

All holding times were met. Laboratory quality control analysis frequencies were acceptable. Reporting limits were slightly elevated. All LCS and surrogate recoveries and most MS and MSD recoveries were within control limits. MS/MSD RPDs were within the laboratory-specified control limits. Sample confirmation criteria were met for most samples and analytes. However, SDC-SS02-000014 exceeded the sample confirmation criteria for Aroclor 1254, and the associated result was flagged with a J.

3.3.2.5 Organotins

Most holding times and holding requirements were met, and if exceedances occurred, these were considered acceptable. Reporting limits were slightly elevated for a few samples. With reanalyses, most laboratory blank results were acceptable. However, the surrogate recovery in the method blank was less than the control limit for several samples. These samples were not re-extracted because no analyte was detected, but associated values received a UJ flag. LCS, MS, and MSD recoveries were all acceptable. MS, MSD RPDs were acceptable.

3.3.2.6 PAHs (Screening Method)

All holding times and reporting limits were met for PAH screening. Surrogate, LCS, MS, and MSD recoveries were all acceptable. MS and MSD RPDs were slightly above the laboratory control limit.

3.4 COMPARISON TO RELEVANT CRITERIA

Analytical results from top composites (representative of material to be removed) and bottom composites (representative of the post-dredge surface) were compared to various sediment criteria, with comparison to DMEF criteria as the most relevant. PAH-screening results were not compared to criteria as these individual intervals were subsequently used to generate a bottom composite. Therefore, the bottom composite results are more representative of the post-dredge surface quality.

3.4.1 Dredge Material Evaluation Framework

Since this sediment characterization project is directed towards characterizing material for maintenance dredging, comparison to DMEF criteria is the most relevant. In general, there were very few DMEF screening level exceedances (six, total). They occurred only in surface composites; composites generated at depth considered representative of the post-dredge surface were largely devoid of detections and when detections occurred, they were many times below screening levels. Table 3.3 shows only those samples that exceed screening levels and the degree of exceedance (i.e. how many times the sample exceeded the SL). There were no DMEF bioaccumulation trigger exceedances. There was a summed DDT exceedance for SS01-000007, a surface composite located on the southern river side, but the degree of exceedance was slight (1.48). The majority of exceedances (four of six) occurred in SS02-000013, the surface composite of the more northern river core. There were very slight exceedances for indeno(1,2,3-cd)pyrene and benzo(g,h,I)perylene, two ubiquitous high molecular weight PAHs. Furthermore, there was a slight (1.46) screening level exceedance for total PCBs at this core. The most significant screening level exceedance for the entire sampling effort was summed DDTs in this sample (37 ug/Kg, 5.36 times the screening level). Notably, this core contained the thickest lens of overlying silty sand/sandy silt that appeared to be unique to these river cores.

SDC-SS06-000007, the surface composite of core SS06 located in Berth 3, also contained an exceedance for total PCBs (2.31 times the screening level value).

No exceedances occurred in cores SDC-SS03 through SDC-SS05. Importantly, even in cores with minor exceedances, no exceedances occurred at depth (i.e. lower composite) in the cores.

3.4.2 Freshwater Sediment Quality Values

In the absence of any Oregon freshwater sediment quality guidance, freshwater sediment quality values developed by MacDonald et al and Ingersoll et al have been used for comparison. MacDonald et al developed 28 Freshwater Sediment Quality Guidelines called "Consensus Based Freshwater Quality Guidelines", including a "Probable Effects Concentration" (PEC) above which adverse effects may occur (MacDonald et al 2000; Ingersoll et al 2000). Additionally, these values or multiplications of these values (i.e. 5X PEC) have been proposed for use as screening tools for Portland Harbor by the Lower Willamette Group (LWG 2002). These comparisons are provided only to illustrate the very high quality of the post-dredge surface (i.e. the bottom composites).

There were only three PEC value exceedances, all less than 1.4 times the PEC value, and all for PAHs occurring in the surface composite of core SDC-SS02 (sample SDC-SS02-000013). These exceedances were for naphthalene, phenanthrene, and pyrene. No exceedances occurred at depth. There were no exceedances of any 5X PEC "screening" values.

3.4.3 Portland Harbor Area-Wide "Baseline" Values

It is important to note that all exceedances are within the "baseline" or "background" Portland Harbor range of data developed by the Oregon Department of Environmental Quality (ODEQ). Table 3.5 shows several lines of evidence for this. For instance, ODEQs apparent Portland Harbor Sediment baseline for total DDTs is 220 µg/Kg, and the maximum detected DDTs value during this project in core SDC-SS02 is 37 µg/Kg. The LWG's Phase 1 Work Plan cites a detection frequency for DDTs of 73 percent within the Portland Harbor Initial Study Area with maximum detects up to 84,909 µg/Kg, indicating a widespread occurrence of DDTs within the study area (LWG 2002). Subsurface sediment results developed by Weston do not tabulate total DDTs, but instead provide arthimetic means for 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT range from 213 to 1762 µg/Kg. Therefore, these DDT exceedances in this March IT Slip sampling event are well within the general "background", and in fact at the low end, for Portland Harbor. Notably, DDT exceedances only occurred in the river berths, not within the slip. Also importantly, these exceedances were not PEC value exceedances, just DMEF screening level exceedances related to tiered testing for open water disposal. These exceedances may not relate to a genuine biological effect.

Total PCBs exceeded DMEF screening values at two cores, one on the river side at SDC-SS02 (190 µg/Kg J) and one within the slip at SDC-SS06 (300 µg/Kg). ODEQ's baseline value is 180 µg/Kg. The LWG notes a detection frequency of total PCBs at 45 percent within the initial study area. Weston subsurface data indicates an arithmetic mean of 3818.7 µg/Kg and a median value of 72 µg/Kg. Therefore, these detections should not be considered remarkable or as an indication of ongoing sources, but rather as potentially indicative of a general background. Importantly, these exceedances were not PEC value exceedances and therefore may not relate to a genuine biological effect.

3.4.4 DMEF Site Ranking

The Lower Columbia River Management Area DMEF guidance manual (USACE1998) provides a classification scheme for initial management area ranking. These initial rankings serve as one of the project variables factored into the development of sediment sampling and analyses plans. Due to both upland activities (i.e. the Burgard Yard) and the location of the site (within both an active shipping area and a Superfund site), the IT Slip and river berths could receive an initial Management Area Ranking definition/classification of "Moderate" or possibly, "High."

The DMEF guidance also defines heterogeneous sediments as those in which physical characteristics are dissimilar within the sampling depth. Characteristics of such sediments include obvious layering of sediments, lenses of dissimilar material, or other characteristics. Due to the stratigraphic appearance of cores collected, these sediments seem to be heterogeneous (Appendix A).

Based on analytical results gathered during these investigations, this project should receive a ranking of "Low Moderate", as there are six screening level exceedances but no exceedances are greater than the screening level plus maximum level divided by two.

4.0 Conclusions

This sampling and analyses project was conducted to characterize sediment quality for refinement of dredge design to ensure that the post-dredge sediment surface will be acceptable. The project was also undertaken to characterize dredge materials to be removed and the appropriateness of the DMEF site ranking.

Results indicate that the sediments are within the range of "background" or "baseline" Portland Harbor sediment contaminant concentrations. Only six DMEF screening level value exceedances occurred, with five out of six exceedances occurring within a thicker surface lens of silty material of likely depositional origin within the river berths. All exceedances are within the expected background levels of widely distributed contaminants found in Portland Harbor. The sediment analytical data also indicates that the predicted exposed post-dredge surface within each berth will be of high quality with zero to trace analyte detection. Based on the results of this investigation, the Management Area Ranking definition/classification for this project should be classified as "Low Moderate".

5.0 References

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SSI-IT SEDS

International Terminal Sediment Data Report

Tables

Final

SCHN00158092

Table 2.1
Core Designations and Coordinates

Core Designation	Oregon State Plane North Zone NAD27	
	Y (Northing)	X (Easting)
SDC-SS01	715858	1416509
SDC-SS02	716566	1416243
SDC-SS03R	717170	1416183
SDC-SS04	717245	1416540
SDC-SS05	717228	1417008
SDC-SS06	717197	1417424

Table 2.2
Compounds Analyzed, Analysis Methods, and Target Reporting Limits

Parameter	Analysis Method	Reporting Limit[1]
Conventionals		
Grain Size	PSEP/ASTM D 422	NA
Total Solids (%)	EPA 160.3 M/PSEP	NA
Total Organic Carbon (%)	ASTM D 4129-82 M/ PSEP	0.05
Metals (mg/kg)		
Antimony	EPA 200.8	0.05
Arsenic	EPA 200.8	0.5
Cadmium	EPA 200.8	0.05
Copper	EPA 200.8	0.1
Lead	EPA 200.8	0.05
Mercury	EPA 7471 CVAA	0.02
Nickel	EPA 200.8	0.2
Silver	EPA 200.8	0.02
Zinc	EPA 200.8	0.5
Organometallic compounds (µg/kg)		
Tributyltin (sediment)	Krone	1
Organics (µg/kg)		
Total LPAH		
Naphthalene	EPA 8270C-low level	10
Acenaphthylene	EPA 8270C-low level	10
Acenaphthene	EPA 8270C-low level	10
Fluorene	EPA 8270C-low level	10
Phenanthrene	EPA 8270C-low level	10
Anthracene	EPA 8270C-low level	10
2-Methylnaphthalene	EPA 8270C-low level	10
Total HPAH		
Fluoranthene	EPA 8270C-low level	10

Table 2.2
Compounds Analyzed, Analysis Methods, and Target Reporting Limits

Parameter	Analysis Method	Reporting Limit[1]
Pyrene	EPA 8270C-low level	10
Benz(a)anthracene	EPA 8270C-low level	10
Chrysene	EPA 8270C-low level	10
Benzofluoranthenes (b+k)	EPA 8270C-low level	20
Benzo(a)pyrene	EPA 8270C-low level	10
Indeno(1,2,3-c,d)pyrene	EPA 8270C-low level	10
Dibenz(a,h)anthracene	EPA 8270C-low level	10
Benzo(g,h,I)perylene	EPA 8270C-low level	10
Chlorinated hydrocarbons (µg/kg)		
1,3-Dichlorbenzene	EPA 8270C-low level	10
1,4-Dichlorobenzene	EPA 8270C-low level	10
1,2-Dichlorobenzene	EPA 8270C-low level	10
1,2,4-Trichlorobenzene	EPA 8270C-low level	10
Hexachlorobenzene	EPA 8270C-low level	10
Phthalates (µg/kg)		
Dimethyl phthalate	EPA 8270C-low level	10
Diethyl phthalate	EPA 8270C-low level	10
Di-n-butyl phthalate	EPA 8270C-low level	10
Butyl benzyl phthalate	EPA 8270C-low level	10
Bis(2-ethylhexyl) phthalate	EPA 8270C-low level	200
Di-n-octyl phthalate	EPA 8270C-low level	10
Phenols (µg/kg)		
Phenol	EPA 8270C-low level	30
2-Methylphenol	EPA 8270C-low level	10
Phenols (µg/kg) cont.		
4-Methylphenol	EPA 8270C-low level	10
2,4-Dimethylphenol	EPA 8270C-low level	50

Table 2.2
Compounds Analyzed, Analysis Methods, and Target Reporting Limits

Parameter	Analysis Method	Reporting Limit[1]
Pentachlorophenol	EPA 8270C-low level	50
Misc. extractables (µg/kg)		
Benzyl alcohol	EPA 8270C-low level	10
Benzoic acid	EPA 8270C-low level	200
Dibenzofuran	EPA 8270C-low level	10
Hexachloroethane	EPA 8270C-low level	10
Hexachlorobutadiene	EPA 8270C-low level	10
N-Nitrosodiphenylamine	EPA 8270C-low level	10
Pesticides (µg/kg)		
Total DDT (4,4'-DDD, 4,4'-DDE, 4,4'-DDT)	--	3.0
4,4'-DDD	EPA 8081 A-low level	1.0
4,4'-DDE	EPA 8081 A-low level	1.0
4,4'-DDT	EPA 8081 A-low level	1.0
Aldrin	EPA 8081 A-low level	1.0
Alpha-Chlordane	EPA 8081 A-low level	1.0
Dieldrin	EPA 8081 A-low level	1.0
Heptachlor	EPA 8081 A-low level	1.0
Gamma-BHC (Lindane)	EPA 8081 A-low level	1.0
PCBs (µg/kg)		
Total PCBs[2]	EPA 8082 A-low level	80
PAH screening (µg/kg)		
Total PAHs	GC/MS-SIM	90

Notes:

1 Reporting limits are for soil with 0% moisture content. The actual reporting limits for sediment samples can vary depending on the moisture content. Assuming 50% moisture content, the reporting limits will double for each analyte but still remain below the screening levels specified in the DMEF (USACE 1998). Deviations are noted in the Data Validation Report (see Appendix D).

2 Total PCBs is a sum of Aroclors 1016, 1221, 1232, 1242, 1248, 1254, and 1260.

Table 3.1
Results of Conventional and Chemical Analyses

Sample ID	Collection Date	Matrix	Analysis	Analyte	Conc	Interpretive Qualifier	Unit
SDC-SS01-000007	3/12/2003 15:16	Sediment	200.8	Antimony (total)	0.392	J	mg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	200.8	Arsenic (total)	2.72		mg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	200.8	Cadmium (total)	0.48		mg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	200.8	Copper (total)	27.4		mg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	200.8	Lead (total)	25.6		mg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	200.8	Nickel (total)	19.1		mg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	200.8	Silver (total)	0.324		mg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	200.8	Zinc (total)	107		mg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	7471A	Mercury (total)	0.09		mg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8081A	4,4'-DDD	5.5		µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8081A	4,4'-DDE	4.7	J	µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8081A	4,4'-DDT	5.2	UM	µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8081A	Aldrin	2.4	J	µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8081A	alpha-Chlordane	0.19	UM	µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8081A	DDTs (total-calc'd p,p')	10.2	J	µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8081A	Dieldrin	0.2	U	µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8081A	gamma-BHC	1.6	UM	µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8081A	Heptachlor	0.29	U	µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8082	PCB-1016	1.5	U	µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8082	PCB-1221	1.5	U	µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8082	PCB-1232	1.5	U	µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8082	PCB-1242	1.5	U	µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8082	PCB-1248	1.5	U	µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8082	PCB-1254	89		µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8082	PCB-1260	25		µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8082	PCBs (total)	114		µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	1,2,4-Trichlorobenzene	2.7	U	µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	1,2-Dichlorobenzene	2.3	U	µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	1,3-Dichlorobenzene	2.9	U	µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	1,4-Dichlorobenzene	3.4	U	µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	2,4-Dimethylphenol	9.8	U	µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	2-Methylnaphthalene	100		µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	2-Methylphenol	6.1	U	µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	4-Methylphenol	84		µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	Acenaphthene	85		µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	Acenaphthylene	42		µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	Anthracene	95		µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	Benzo(a)anthracene	180		µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	Benzo(a)pyrene	260		µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	Benzo(b)fluoranthene	220		µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	Benzo(g,h,i)perylene	210		µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	Benzo(k)fluoranthene	170		µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	Benzo(b+k)fluoranthene	390		µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	Benzoic acid	170	U	µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	Benzyl alcohol	7.9	J	µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	bis(2-ethylhexyl)phthalate	770	J	µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	Butyl benzyl phthalate	170		µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	Chrysene	230		µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	Dibenzo(a,h)anthracene	41		µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	Dibenzofuran	40		µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	Diethylphthalate	6.2	U	µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	Dimethyl phthalate	3.2	U	µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	Di-n-butyl phthalate	23		µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	Di-n-octyl phthalate	2.2	U	µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	Fluoranthene	350		µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	Fluorene	76		µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	Hexachlorobenzene	3.8	U	µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	Hexachlorobutadiene	2.5	U	µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	Hexachloroethane	3.9	U	µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	Indeno(1,2,3-cd)pyrene	200		µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	Naphthalene	270		µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	N-Nitrosodiphenylamine	3.9	U	µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	Pentachlorophenol	16	U	µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	Phenanthrene	360		µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	Phenol	11	J	µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	Pyrene	460		µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	LPAH (Total)	1028		µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	8270C	HPAH (Total)	2321		µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	Krone	Butyltin	2		µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	Krone	Dibutyltin	25		µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	Krone	Tetrabutyltin	1.5	U	µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	Krone	Tributyltin	150		µg/kg
SDC-SS01-000007	3/12/2003 15:16	Sediment	PSEP	Clay (percent)	11.1		%
SDC-SS01-000007	3/12/2003 15:16	Sediment	PSEP	Coarse Sand	2.01		%

Table 3.1
Results of Conventional and Chemical Analyses

Sample ID	Collection Date	Matrix	Analysis	Analyte	Conc	Interpretive Qualifier	Unit
SDC-SS01-000007	3/12/2003 15:16	Sediment	PSEP	Fine Sand	11.7		%
SDC-SS01-000007	3/12/2003 15:16	Sediment	PSEP	Gravel (percent)	1.47		%
SDC-SS01-000007	3/12/2003 15:16	Sediment	PSEP	Medium Sand	21.1		%
SDC-SS01-000007	3/12/2003 15:16	Sediment	PSEP	Silt (percent)	39.7		%
SDC-SS01-000007	3/12/2003 15:16	Sediment	PSEP	Very Fine Sand	13.1		%
SDC-SS01-000007	3/12/2003 15:16	Sediment	PSEP	Very Coarse Sand	0.51		%
SDC-SS01-000007	3/12/2003 15:16	Sediment	PSEP	Total Organic Carbon (TOC)	1.59		%
SDC-SS01-007010C	3/12/2003 15:16	Sediment	200.8	Antimony (total)	0.05	UJ	mg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	200.8	Arsenic (total)	1.9		mg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	200.8	Cadmium (total)	0.05		mg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	200.8	Copper (total)	13.2		mg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	200.8	Lead (total)	2.63		mg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	200.8	Nickel (total)	16.1		mg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	200.8	Silver (total)	0.02	J	mg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	200.8	Zinc (total)	38.6		mg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	7471A	Mercury (total)	0.01	J	mg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8081A	4,4'-DDD	0.11	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8081A	4,4'-DDE	0.13	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8081A	4,4'-DDT	0.22	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8081A	Aldrin	0.12	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8081A	alpha-Chlordane	0.13	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8081A	DDTs (total-calc'd p,p')	0.22	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8081A	Dieldrin	0.15	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8081A	gamma-BHC	0.22	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8081A	Heptachlor	0.21	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8082	PCB-1016	2.3	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8082	PCB-1221	2.3	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8082	PCB-1232	2.3	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8082	PCB-1242	2.3	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8082	PCB-1248	2.3	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8082	PCB-1254	2.3	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8082	PCB-1260	2.3	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8082	PCBs (total)	2.3	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	1,2,4-Trichlorobenzene	2	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	1,2-Dichlorobenzene	1.7	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	1,3-Dichlorobenzene	2.1	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	1,4-Dichlorobenzene	2.5	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	2,4-Dimethylphenol	7.1	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	2-Methylnaphthalene	1.6	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	2-Methylphenol	4.4	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	4-Methylphenol	3.7	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	Acenaphthene	1.3	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	Acenaphthylene	1.8	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	Anthracene	1.8	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	Benzo(a)anthracene	1.8	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	Benzo(a)pyrene	2.1	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	Benzo(b)fluoranthene	3.2	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	Benzo(g,h,i)perylene	3	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	Benzo(k)fluoranthene	3.2	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	Benzo(b+k)fluoranthene	3.2	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	Benzoic acid	130	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	Benzyl alcohol	4.8	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	bis(2-ethylhexyl)phthalate	7.9	J	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	Butyl benzyl phthalate	2	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	Chrysene	1.8	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	Dibenzo(a,h)anthracene	2.9	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	Dibenzofuran	1.7	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	Diethylphthalate	4.5	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	Dimethyl phthalate	2.3	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	Di-n-butyl phthalate	3.4	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	Di-n-octyl phthalate	1.6	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	Fluoranthene	2.9	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	Fluorene	2.2	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	Hexachlorobenzene	2.7	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	Hexachlorobutadiene	1.8	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	Hexachloroethane	2.9	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	Indeno(1,2,3-cd)pyrene	2.5	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	Naphthalene	1.7	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	N-Nitrosodiphenylamine	2.9	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	Pentachlorophenol	11	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	Phenanthrene	1.7	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	Phenol	2.5	J	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	Pyrene	1.7	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	LPAH (Total)	2.2	U	µg/kg

Table 3.1
Results of Conventional and Chemical Analyses

Sample ID	Collection Date	Matrix	Analysis	Analyte	Conc	Interpretive Qualifier	Unit
SDC-SS01-007010C	3/12/2003 15:16	Sediment	8270C	HPAH (Total)	3.2	U	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	Krone	Butyltin	0.6	UJ	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	Krone	Dibutyltin	0.94	UJ	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	Krone	Tetrabutyltin	1.1	UJ	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	Krone	Tributyltin	0.46	UJ	µg/kg
SDC-SS01-007010C	3/12/2003 15:16	Sediment	PSEP	Clay (percent)	0.56		%
SDC-SS01-007010C	3/12/2003 15:16	Sediment	PSEP	Coarse Sand	10.8		%
SDC-SS01-007010C	3/12/2003 15:16	Sediment	PSEP	Fine Sand	23		%
SDC-SS01-007010C	3/12/2003 15:16	Sediment	PSEP	Gravel (percent)	0.1		%
SDC-SS01-007010C	3/12/2003 15:16	Sediment	PSEP	Medium Sand	63.1		%
SDC-SS01-007010C	3/12/2003 15:16	Sediment	PSEP	Silt (percent)	1.68		%
SDC-SS01-007010C	3/12/2003 15:16	Sediment	PSEP	Very Fine Sand	1.96		%
SDC-SS01-007010C	3/12/2003 15:16	Sediment	PSEP	Very Coarse Sand	0.3		%
SDC-SS01-007010C	3/12/2003 15:16	Sediment	PSEP	Total Organic Carbon (TOC)	0.12		%
SDC-SS02-000013	3/12/2003 16:45	Sediment	200.8	Antimony (total)	0.371	J	mg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	200.8	Arsenic (total)	3.18		mg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	200.8	Cadmium (total)	0.456		mg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	200.8	Copper (total)	26.6		mg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	200.8	Lead (total)	23.5		mg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	200.8	Nickel (total)	17		mg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	200.8	Silver (total)	0.442		mg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	200.8	Zinc (total)	84.7		mg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	7471A	Mercury (total)	0.25		mg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8081A	4,4'-DDD	20		µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8081A	4,4'-DDE	17	J	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8081A	4,4'-DDT	6.3	UM	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8081A	Aldrin	1.2	J	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8081A	alpha-Chlordane	0.18	U	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8081A	DDTs (total-calc'd p,p')	37	J	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8081A	Dieldrin	0.19	U	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8081A	gamma-BHC	1.5	UM	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8081A	Heptachlor	0.28	U	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8082	PCB-1016	1.5	U	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8082	PCB-1221	1.5	U	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8082	PCB-1232	1.5	U	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8082	PCB-1242	1.5	U	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8082	PCB-1248	1.5	U	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8082	PCB-1254	110	J	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8082	PCB-1260	80		µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8082	PCBs (total)	190	J	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	1,2,4-Trichlorobenzene	26	U	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	1,2-Dichlorobenzene	23	U	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	1,3-Dichlorobenzene	28	U	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	1,4-Dichlorobenzene	33	U	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	2,4-Dimethylphenol	95	U	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	2-Methylnaphthalene	290		µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	2-Methylphenol	59	U	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	4-Methylphenol	190		µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	Acenaphthene	350		µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	Acenaphthylene	130		µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	Anthracene	340		µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	Benzo(a)anthracene	560		µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	Benzo(a)pyrene	790		µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	Benzo(b)fluoranthene	510		µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	Benzo(g,h,i)perylene	740		µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	Benzo(k)fluoranthene	460		µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	Benzo(b+k)fluoranthene	970		µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	Benzoic acid	1700	U	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	Benzyl alcohol	64	U	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	bis(2-ethylhexyl)phthalate	62	J	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	Butyl benzyl phthalate	26	U	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	Chrysene	710		µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	Dibenzo(a,h)anthracene	92	J	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	Dibenzofuran	110		µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	Diethylphthalate	61	U	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	Dimethyl phthalate	32	U	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	Di-n-butyl phthalate	45	U	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	Di-n-octyl phthalate	21	U	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	Fluoranthene	1400		µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	Fluorene	290		µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	Hexachlorobenzene	37	U	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	Hexachlorobutadiene	25	U	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	Hexachloroethane	38	U	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	Indeno(1,2,3-cd)pyrene	620		µg/kg

Table 3.1
Results of Conventional and Chemical Analyses

Sample ID	Collection Date	Matrix	Analysis	Analyte	Conc	Interpretive Qualifier	Unit
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	Naphthalene	740		µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	N-Nitrosodiphenylamine	38	U	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	Pentachlorophenol	150	U	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	Phenanthrene	1400		µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	Phenol	33	U	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	Pyrene	2100		µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	LPAH (Total)	3540		µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	8270C	HPAH (Total)	7982	J	µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	Krone	Butyltin	0.82		µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	Krone	Dibutyltin	2.3		µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	Krone	Tetrabutyltin	1.4		µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	Krone	Tributyltin	7.9		µg/kg
SDC-SS02-000013	3/12/2003 16:45	Sediment	PSEP	Clay (percent)	17.1		%
SDC-SS02-000013	3/12/2003 16:45	Sediment	PSEP	Coarse Sand	3.31		%
SDC-SS02-000013	3/12/2003 16:45	Sediment	PSEP	Fine Sand	6.44		%
SDC-SS02-000013	3/12/2003 16:45	Sediment	PSEP	Gravel (percent)	0.09		%
SDC-SS02-000013	3/12/2003 16:45	Sediment	PSEP	Medium Sand	15.2		%
SDC-SS02-000013	3/12/2003 16:45	Sediment	PSEP	Silt (percent)	47.3		%
SDC-SS02-000013	3/12/2003 16:45	Sediment	PSEP	Very Coarse Sand	0.53		%
SDC-SS02-000013	3/12/2003 16:45	Sediment	PSEP	Very Fine Sand	9.32		%
SDC-SS02-000013	3/12/2003 16:45	Sediment	PSEP	Total Organic Carbon (TOC)	2.06		%
SDC-SS02-015017C	3/12/2003 16:45	Sediment	200.8	Antimony (total)	0.05	J	mg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	200.8	Arsenic (total)	2.5		mg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	200.8	Cadmium (total)	0.06		mg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	200.8	Copper (total)	13.1		mg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	200.8	Lead (total)	2.98		mg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	200.8	Nickel (total)	16.3		mg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	200.8	Silver (total)	0.02	J	mg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	200.8	Zinc (total)	37.5		mg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	7471A	Mercury (total)	0.01	U	mg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8081A	4,4'-DDD	0.1	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8081A	4,4'-DDE	0.13	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8081A	4,4'-DDT	0.22	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8081A	Aldrin	0.12	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8081A	alpha-Chlordane	0.13	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8081A	DDTs (total-calc'd p,p')	0.22	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8081A	Dieldrin	0.14	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8081A	gamma-BHC	0.22	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8081A	Heptachlor	0.21	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8082	PCB-1016	2.3	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8082	PCB-1221	2.3	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8082	PCB-1232	2.3	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8082	PCB-1242	2.3	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8082	PCB-1248	2.3	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8082	PCB-1254	2.3	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8082	PCB-1260	2.3	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8082	PCBs (total)	2.3	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	1,2,4-Trichlorobenzene	1.9	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	1,2-Dichlorobenzene	1.7	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	1,3-Dichlorobenzene	2.1	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	1,4-Dichlorobenzene	2.5	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	2,4-Dimethylphenol	7	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	2-Methylnaphthalene	1.6	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	2-Methylphenol	4.4	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	4-Methylphenol	3.7	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	Acenaphthene	1.3	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	Acenaphthylene	1.8	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	Anthracene	1.8	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	Benzo(a)anthracene	2.4	J	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	Benzo(a)pyrene	2.4	J	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	Benzo(b)fluoranthene	3.2	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	Benzo(g,h,i)perylene	3	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	Benzo(k)fluoranthene	3.2	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	Benzo(b+k)fluoranthene	3.2	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	Benzoic acid	130	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	Benzyl alcohol	4.7	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	bis(2-ethylhexyl)phthalate	5	J	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	Butyl benzyl phthalate	1.9	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	Chrysene	2.5	J	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	Dibenzo(a,h)anthracene	2.8	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	Dibenzofuran	1.7	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	Diethylphthalate	4.5	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	Dimethyl phthalate	2.3	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	Di-n-butyl phthalate	3.3	U	µg/kg

Table 3.1
Results of Conventional and Chemical Analyses

Sample ID	Collection Date	Matrix	Analysis	Analyte	Conc	Interpretive Qualifier	Unit
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	Di-n-octyl phthalate	1.6	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	Fluoranthene	3.9	J	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	Fluorene	2.2	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	Hexachlorobenzene	2.7	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	Hexachlorobutadiene	1.8	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	Hexachloroethane	2.8	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	Indeno(1,2,3-cd)pyrene	2.5	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	Naphthalene	1.7	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	N-Nitrosodiphenylamine	2.8	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	Pentachlorophenol	11	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	Phenanthrene	2.4	J	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	Phenol	2.5	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	Pyrene	5.6	J	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	LPAH (Total)	2.4	U	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	8270C	HPAH (Total)	16.8	J	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	Krone	Tetrabutyltin	1.1	UJ	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	Krone	Tributyltin	0.46	UJ	µg/kg
SDC-SS02-015017C	3/12/2003 16:45	Sediment	PSEP	Clay (percent)	0.71		%
SDC-SS02-015017C	3/12/2003 16:45	Sediment	PSEP	Coarse Sand	5.64		%
SDC-SS02-015017C	3/12/2003 16:45	Sediment	PSEP	Fine Sand	25.1		%
SDC-SS02-015017C	3/12/2003 16:45	Sediment	PSEP	Gravel (percent)	0.04		%
SDC-SS02-015017C	3/12/2003 16:45	Sediment	PSEP	Medium Sand	62		%
SDC-SS02-015017C	3/12/2003 16:45	Sediment	PSEP	Silt (percent)	2.98		%
SDC-SS02-015017C	3/12/2003 16:45	Sediment	PSEP	Very Coarse Sand	0.12		%
SDC-SS02-015017C	3/12/2003 16:45	Sediment	PSEP	Very Fine Sand	2.9		%
SDC-SS02-015017C	3/12/2003 16:45	Sediment	PSEP	Total Organic Carbon (TOC)	0.07		%
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	200.8	Antimony (total)	0.05	J	mg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	200.8	Arsenic (total)	1.7		mg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	200.8	Cadmium (total)	0.05	J	mg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	200.8	Copper (total)	12.8		mg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	200.8	Lead (total)	2.52		mg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	200.8	Nickel (total)	16.7		mg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	200.8	Silver (total)	0.03		mg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	200.8	Zinc (total)	35.5		mg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	7471A	Mercury (total)	0.01	U	mg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8081A	4,4'-DDD	0.11	U	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8081A	4,4'-DDE	0.13	U	µg/kg
SDC-SS03R2-002004C	3/12/2003 16:45	Sediment	8081A	4,4'-DDT	0.23	U	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8081A	Aldrin	0.12	U	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8081A	alpha-Chlordane	0.14	U	µg/kg
SDC-SS03R2-002004C	3/12/2003 16:45	Sediment	8081A	DDTs (total-calc'd p,p')	0.23	U	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8081A	Dieldrin	0.15	U	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8081A	gamma-BHC	0.63	J	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8081A	Heptachlor	0.24	UM	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8082	PCB-1016	2.4	U	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8082	PCB-1221	2.4	U	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8082	PCB-1232	2.4	U	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8082	PCB-1242	2.4	U	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8082	PCB-1248	2.4	U	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8082	PCB-1254	2.4	U	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8082	PCB-1260	2.4	U	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8082	PCBs (total)	2.4	U	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	1,2,4-Trichlorobenzene	2	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	1,2-Dichlorobenzene	1.7	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	1,3-Dichlorobenzene	2.1	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	1,4-Dichlorobenzene	2.5	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	2,4-Dimethylphenol	7.2	U	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	2-Methylnaphthalene	1.6	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	2-Methylphenol	4.5	U	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	4-Methylphenol	3.8	U	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	Acenaphthene	1.4	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	Acenaphthylene	1.9	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	Anthracene	1.9	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	Benzo(a)anthracene	1.9	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	Benzo(a)pyrene	2.1	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	Benzo(b)fluoranthene	3.3	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	Benzo(g,h,i)perylene	3	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	Benzo(k)fluoranthene	3.3	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	Benzo(b+k)fluoranthene	3.3	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	Benzoic acid	130	U	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	Benzyl alcohol	4.9	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	bis(2-ethylhexyl)phthalate	5.4	J	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	Butyl benzyl phthalate	2	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	Chrysene	1.9	UJ	µg/kg

Table 3.1
Results of Conventional and Chemical Analyses

Sample ID	Collection Date	Matrix	Analysis	Analyte	Conc	Interpretive Qualifier	Unit
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	Dibenzo(a,h)anthracene	2.9	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	Dibenzofuran	1.7	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	Diethylphthalate	4.6	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	Dimethyl phthalate	2.4	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	Di-n-butyl phthalate	3.4	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	Di-n-octyl phthalate	1.6	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	Fluoranthene	2.9	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	Fluorene	2.3	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	Hexachlorobenzene	2.8	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	Hexachlorobutadiene	1.9	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	Hexachloroethane	2.9	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	Indeno(1,2,3-cd)pyrene	2.5	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	Naphthalene	1.7	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	N-Nitrosodiphenylamine	2.9	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	Pentachlorophenol	12	U	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	Phenanthrene	1.7	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	Phenol	2.5	U	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	Pyrene	1.7	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	LPAH (Total)	2.3	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	8270C	HPAH (Total)	3.3	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	Krone	Butyltin	0.62	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	Krone	Dibutyltin	0.95	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	Krone	Tetrabutyltin	1.1	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	Krone	Tributyltin	0.47	UJ	µg/kg
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	PSEP	Clay (percent)	0.41		%
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	PSEP	Coarse Sand	4.98		%
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	PSEP	Fine Sand	25		%
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	PSEP	Gravel (percent)	0.05		%
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	PSEP	Medium Sand	69.6		%
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	PSEP	Silt (percent)	0.71		%
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	PSEP	Very Coarse Sand	0.07		%
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	PSEP	Very Fine Sand	1.14		%
SDC-SS03R2-002004C	3/12/2003 12:45	Sediment	PSEP	Total Organic Carbon (TOC)	0.05		%
SDC-SS04-000008	3/11/2003 14:33	Sediment	200.8	Antimony (total)	0.262	J	mg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	200.8	Arsenic (total)	1.98		mg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	200.8	Cadmium (total)	0.122		mg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	200.8	Copper (total)	15.3		mg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	200.8	Lead (total)	9.02		mg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	200.8	Nickel (total)	16.3		mg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	200.8	Silver (total)	0.123		mg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	200.8	Zinc (total)	56.9		mg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	7471A	Mercury (total)	0.06		mg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8081A	4,4'-DDD	2.4		µg/kg
SDC-SS04-000008	3/12/2003 16:45	Sediment	8081A	4,4'-DDE	4.1	J	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8081A	4,4'-DDT	3.4	UM	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8081A	Aldrin	0.13	U	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8081A	alpha-Chlordane	0.14	U	µg/kg
SDC-SS04-000008	3/12/2003 16:45	Sediment	8081A	DDTs (total-calc'd p,p')	6.5	J	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8081A	Dieldrin	0.15	U	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8081A	gamma-BHC	1.2	UM	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8081A	Heptachlor	0.22	U	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8082	PCB-1016	1.1	U	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8082	PCB-1221	1.1	U	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8082	PCB-1232	1.1	U	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8082	PCB-1242	1.1	U	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8082	PCB-1248	1.1	U	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8082	PCB-1254	69		µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8082	PCB-1260	27		µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8082	PCBs (total)	96		µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	1,2,4-Trichlorobenzene	2.1	U	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	1,2-Dichlorobenzene	1.8	U	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	1,3-Dichlorobenzene	2.2	U	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	1,4-Dichlorobenzene	2.6	U	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	2,4-Dimethylphenol	7.4	U	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	2-Methylnaphthalene	3.5	J	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	2-Methylphenol	4.6	U	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	4-Methylphenol	5.3	J	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	Acenaphthene	4.2	J	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	Acenaphthylene	12		µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	Anthracene	15		µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	Benzo(a)anthracene	48		µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	Benzo(a)pyrene	72		µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	Benzo(b)fluoranthene	52		µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	Benzo(g,h,i)perylene	60		µg/kg

Table 3.1
Results of Conventional and Chemical Analyses

Sample ID	Collection Date	Matrix	Analysis	Analyte	Conc	Interpretive Qualifier	Unit
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	Benzo(k)fluoranthene	41		µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	Benzo(b+k)fluoranthene	93		µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	Benzoic acid	130	U	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	Benzyl alcohol	5	U	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	bis(2-ethylhexyl)phthalate	18	J	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	Butyl benzyl phthalate	2.1	U	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	Chrysene	58		µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	Dibenzo(a,h)anthracene	9.8	J	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	Dibenzofuran	1.8	U	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	Diethylphthalate	4.7	U	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	Dimethyl phthalate	2.5	U	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	Di-n-butyl phthalate	3.5	U	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	Di-n-octyl phthalate	1.7	U	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	Fluoranthene	49		µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	Fluorene	2.7	J	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	Hexachlorobenzene	2.9	U	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	Hexachlorobutadiene	1.9	U	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	Hexachloroethane	3	U	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	Indeno(1,2,3-cd)pyrene	57		µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	Naphthalene	11		µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	N-Nitrosodiphenylamine	3	U	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	Pentachlorophenol	12	U	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	Phenanthrene	45		µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	Phenol	6.2	J	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	Pyrene	97		µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	LPAH (Total)	93.4	J	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	8270C	HPAH (Total)	543.8	J	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	Krone	Butyltin	0.63	U	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	Krone	Dibutyltin	2.4		µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	Krone	Tetrabutyltin	1.1	U	µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	Krone	Tributyltin	11		µg/kg
SDC-SS04-000008	3/11/2003 14:33	Sediment	PSEP	Clay (percent)	4.28		%
SDC-SS04-000008	3/11/2003 14:33	Sediment	PSEP	Coarse Sand	6.08		%
SDC-SS04-000008	3/11/2003 14:33	Sediment	PSEP	Fine Sand	18.6		%
SDC-SS04-000008	3/11/2003 14:33	Sediment	PSEP	Gravel (percent)	0.46		%
SDC-SS04-000008	3/11/2003 14:33	Sediment	PSEP	Medium Sand	54.9		%
SDC-SS04-000008	3/11/2003 14:33	Sediment	PSEP	Silt (percent)	10.8		%
SDC-SS04-000008	3/11/2003 14:33	Sediment	PSEP	Very Coarse Sand	0.19		%
SDC-SS04-000008	3/11/2003 14:33	Sediment	PSEP	Very Fine Sand	4.09		%
SDC-SS04-000008	3/11/2003 14:33	Sediment	PSEP	Total Organic Carbon (TOC)	0.38		%
SDC-SS05-0000012	3/11/2003 17:00	Sediment	200.8	Antimony (total)	0.328	J	mg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	200.8	Arsenic (total)	1.5		mg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	200.8	Cadmium (total)	0.096		mg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	200.8	Copper (total)	13.6		mg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	200.8	Lead (total)	7.87		mg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	200.8	Nickel (total)	15.6		mg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	200.8	Silver (total)	0.091		mg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	200.8	Zinc (total)	51.1		mg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	7471A	Mercury (total)	0.04		mg/kg
SDC-SS05-0000012	3/12/2003 16:45	Sediment	8081A	4,4'-DDD	0.47	J	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8081A	4,4'-DDE	1.1	UM	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8081A	4,4'-DDT	4.1	UM	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8081A	Aldrin	0.12	U	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8081A	alpha-Chlordane	0.14	U	µg/kg
SDC-SS05-0000012	3/12/2003 16:45	Sediment	8081A	DDTs (total-calc'd p,p')	0.47	J	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8081A	Dieldrin	0.15	U	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8081A	gamma-BHC	0.23	U	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8081A	Heptachlor	0.22	U	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8082	PCB-1016	1.1	U	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8082	PCB-1221	1.1	U	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8082	PCB-1232	1.1	U	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8082	PCB-1242	1.1	U	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8082	PCB-1248	1.1	U	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8082	PCB-1254	71		µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8082	PCB-1260	23		µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8082	PCBs (total)	94		µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	1,2,4-Trichlorobenzene	2	U	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	1,2-Dichlorobenzene	1.8	U	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	1,3-Dichlorobenzene	2.2	U	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	1,4-Dichlorobenzene	2.6	U	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	2,4-Dimethylphenol	7.4	U	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	2-Methylnaphthalene	5.4	J	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	2-Methylphenol	4.6	U	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	4-Methylphenol	5.1	J	µg/kg

Table 3.1
Results of Conventional and Chemical Analyses

Sample ID	Collection Date	Matrix	Analysis	Analyte	Conc	Interpretive Qualifier	Unit
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	Acenaphthene	4.8	J	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	Acenaphthylene	9.8	J	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	Anthracene	18		µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	Benzo(a)anthracene	31		µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	Benzo(a)pyrene	50		µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	Benzo(b)fluoranthene	43		µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	Benzo(g,h,i)perylene	50		µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	Benzo(k)fluoranthene	30		µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	Benzo(b+k)fluoranthene	73		µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	Benzoic acid	130	U	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	Benzyl alcohol	5	U	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	bis(2-ethylhexyl)phthalate	24	J	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	Butyl benzyl phthalate	7.5	J	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	Chrysene	45		µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	Dibenzo(a,h)anthracene	6.7	J	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	Dibenzofuran	2.8	J	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	Diethylphthalate	4.7	U	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	Dimethyl phthalate	2.4	U	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	Di-n-butyl phthalate	3.5	U	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	Di-n-octyl phthalate	1.6	U	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	Fluoranthene	35		µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	Fluorene	4.1	J	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	Hexachlorobenzene	2.8	U	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	Hexachlorobutadiene	1.9	U	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	Hexachloroethane	3	U	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	Indeno(1,2,3-cd)pyrene	43		µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	Naphthalene	22		µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	N-Nitrosodiphenylamine	3	U	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	Pentachlorophenol	12	U	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	Phenanthrene	36		µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	Phenol	5.5	J	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	Pyrene	93		µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	LPAH (Total)	100.1	J	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	8270C	HPAH (Total)	426.7	J	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	Krone	Butyltin	0.63	U	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	Krone	Dibutyltin	1.1	J	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	Krone	Tetrabutyltin	1.1	U	µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	Krone	Tributyltin	2.6		µg/kg
SDC-SS05-0000012	3/11/2003 17:00	Sediment	PSEP	Clay (percent)	2.98		%
SDC-SS05-0000012	3/11/2003 17:00	Sediment	PSEP	Coarse Sand	3.83		%
SDC-SS05-0000012	3/11/2003 17:00	Sediment	PSEP	Fine Sand	22.7		%
SDC-SS05-0000012	3/11/2003 17:00	Sediment	PSEP	Gravel (percent)	0.07		%
SDC-SS05-0000012	3/11/2003 17:00	Sediment	PSEP	Medium Sand	58.1		%
SDC-SS05-0000012	3/11/2003 17:00	Sediment	PSEP	Silt (percent)	8.86		%
SDC-SS05-0000012	3/11/2003 17:00	Sediment	PSEP	Very Coarse Sand	0.22		%
SDC-SS05-0000012	3/11/2003 17:00	Sediment	PSEP	Very Fine Sand	6.52		%
SDC-SS05-0000012	3/11/2003 17:00	Sediment	PSEP	Total Organic Carbon (TOC)	0.3		%
SDC-SS05-014016C	3/11/2003 17:00	Sediment	200.8	Antimony (total)	0.06	J	mg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	200.8	Arsenic (total)	1.2		mg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	200.8	Cadmium (total)	0.04	J	mg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	200.8	Copper (total)	11.8		mg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	200.8	Lead (total)	2.28		mg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	200.8	Nickel (total)	14		mg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	200.8	Silver (total)	0.03		mg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	200.8	Zinc (total)	33		mg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	7471A	Mercury (total)	0.01	U	mg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8081A	4,4'-DDD	0.11	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8081A	4,4'-DDE	0.13	U	µg/kg
SDC-SS05-014016C	3/12/2003 16:45	Sediment	8081A	4,4'-DDT	0.22	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8081A	Aldrin	0.12	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8081A	alpha-Chlordane	0.13	U	µg/kg
SDC-SS05-014016C	3/12/2003 16:45	Sediment	8081A	DDTs (total-calc'd p,p')	0.22	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8081A	Dieldrin	0.15	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8081A	gamma-BHC	0.22	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8081A	Heptachlor	0.21	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8082	PCB-1016	2.4	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8082	PCB-1221	2.4	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8082	PCB-1232	2.4	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8082	PCB-1242	2.4	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8082	PCB-1248	2.4	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8082	PCB-1254	2.4	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8082	PCB-1260	2.4	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8082	PCBs (total)	2.4	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	1,2,4-Trichlorobenzene	2	U	µg/kg

Table 3.1
Results of Conventional and Chemical Analyses

Sample ID	Collection Date	Matrix	Analysis	Analyte	Conc	Interpretive Qualifier	Unit
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	1,2-Dichlorobenzene	1.7	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	1,3-Dichlorobenzene	2.1	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	1,4-Dichlorobenzene	2.5	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	2,4-Dimethylphenol	7.2	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	2-Methylnaphthalene	1.6	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	2-Methylphenol	4.4	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	4-Methylphenol	3.8	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	Acenaphthene	1.3	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	Acenaphthylene	1.9	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	Anthracene	1.9	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	Benzo(a)anthracene	1.9	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	Benzo(a)pyrene	2.1	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	Benzo(b)fluoranthene	3.3	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	Benzo(g,h,i)perylene	3	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	Benzo(k)fluoranthene	3.3	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	Benzo(b+k)fluoranthene	3.3	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	Benzoic acid	130	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	Benzyl alcohol	4.8	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	bis(2-ethylhexyl)phthalate	9.9	J	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	Butyl benzyl phthalate	2	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	Chrysene	1.9	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	Dibenzo(a,h)anthracene	2.9	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	Dibenzofuran	1.7	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	Diethylphthalate	4.6	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	Dimethyl phthalate	2.4	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	Di-n-butyl phthalate	3.4	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	Di-n-octyl phthalate	1.6	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	Fluoranthene	2.9	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	Fluorene	2.2	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	Hexachlorobenzene	2.8	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	Hexachlorobutadiene	1.9	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	Hexachloroethane	2.9	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	Indeno(1,2,3-cd)pyrene	2.5	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	Naphthalene	1.7	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	N-Nitrosodiphenylamine	2.9	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	Pentachlorophenol	11	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	Phenanthrene	1.7	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	Phenol	2.5	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	Pyrene	1.7	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	LPAH (Total)	2.2	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	8270C	HPAH (Total)	3.3	U	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	Krone	Butyltin	0.61	UJ	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	Krone	Dibutyltin	0.95	UJ	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	Krone	Tetrabutyltin	1.1	UJ	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	Krone	Tributyltin	0.47	UJ	µg/kg
SDC-SS05-014016C	3/11/2003 17:00	Sediment	PSEP	Clay (percent)	0.4		%
SDC-SS05-014016C	3/11/2003 17:00	Sediment	PSEP	Coarse Sand	9.26		%
SDC-SS05-014016C	3/11/2003 17:00	Sediment	PSEP	Fine Sand	15.4		%
SDC-SS05-014016C	3/11/2003 17:00	Sediment	PSEP	Gravel (percent)	0		%
SDC-SS05-014016C	3/11/2003 17:00	Sediment	PSEP	Medium Sand	69.8		%
SDC-SS05-014016C	3/11/2003 17:00	Sediment	PSEP	Silt (percent)	1.96		%
SDC-SS05-014016C	3/11/2003 17:00	Sediment	PSEP	Very Coarse Sand	0.2		%
SDC-SS05-014016C	3/11/2003 17:00	Sediment	PSEP	Very Fine Sand	1.97		%
SDC-SS05-014016C	3/11/2003 17:00	Sediment	PSEP	Total Organic Carbon (TOC)	0.04	J	%
SDC-SS06-000007	3/13/2003 15:05	Sediment	200.8	Antimony (total)	0.34	J	mg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	200.8	Arsenic (total)	2.98		mg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	200.8	Cadmium (total)	0.349		mg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	200.8	Copper (total)	29.3		mg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	200.8	Lead (total)	30.5		mg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	200.8	Nickel (total)	18.5		mg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	200.8	Silver (total)	0.238		mg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	200.8	Zinc (total)	91.5		mg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	7471A	Mercury (total)	0.12		mg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8081A	4,4'-DDD	0.5	J	µg/kg
SDC-SS06-000007	3/12/2003 16:45	Sediment	8081A	4,4'-DDE	0.13	U	µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8081A	4,4'-DDT	2.6		µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8081A	Aldrin	0.61	UM	µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8081A	alpha-Chlordane	0.36	J	µg/kg
SDC-SS06-000007	3/12/2003 16:45	Sediment	8081A	DDTs (total-calc'd p,p')	3.1	J	µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8081A	Dieldrin	0.18	UM	µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8081A	gamma-BHC	1.2	UM	µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8081A	Heptachlor	0.22	U	µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8082	PCB-1016	1.4	U	µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8082	PCB-1221	1.4	U	µg/kg

Table 3.1
Results of Conventional and Chemical Analyses

Sample ID	Collection Date	Matrix	Analysis	Analyte	Conc	Interpretive Qualifier	Unit
SDC-SS06-000007	3/13/2003 15:05	Sediment	8082	PCB-1232	1.4	U	µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8082	PCB-1242	1.4	U	µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8082	PCB-1248	1.4	U	µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8082	PCB-1254	300		µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8082	PCB-1260	1.4	U	µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8082	PCBs (total)	300		µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	1,2,4-Trichlorobenzene	2.6	U	µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	1,2-Dichlorobenzene	2.2	U	µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	1,3-Dichlorobenzene	2.7	U	µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	1,4-Dichlorobenzene	3.2	U	µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	2,4-Dimethylphenol	9.3	U	µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	2-Methylnaphthalene	11		µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	2-Methylphenol	5.7	U	µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	4-Methylphenol	13		µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	Acenaphthene	22		µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	Acenaphthylene	25		µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	Anthracene	54		µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	Benzo(a)anthracene	150		µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	Benzo(a)pyrene	210		µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	Benzo(b)fluoranthene	270		µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	Benzo(g,h,i)perylene	200		µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	Benzo(k)fluoranthene	120		µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	Benzo(b+k)fluoranthene	390		µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	Benzoic acid	170	U	µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	Benzyl alcohol	6.2	U	µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	bis(2-ethylhexyl)phthalate	250		µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	Butyl benzyl phthalate	28		µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	Chrysene	220		µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	Dibenzo(a,h)anthracene	61		µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	Dibenzofuran	9.2	J	µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	Diethylphthalate	5.9	U	µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	Dimethyl phthalate	3.1	U	µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	Di-n-butyl phthalate	7.8	J	µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	Di-n-octyl phthalate	2.1	U	µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	Fluoranthene	200		µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	Fluorene	19		µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	Hexachlorobenzene	3.6	U	µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	Hexachlorobutadiene	2.4	U	µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	Hexachloroethane	3.7	U	µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	Indeno(1,2,3-cd)pyrene	200		µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	Naphthalene	30		µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	N-Nitrosodiphenylamine	3.7	U	µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	Pentachlorophenol	15	U	µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	Phenanthrene	110		µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	Phenol	10	J	µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	Pyrene	290		µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	LPAH (Total)	271		µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	8270C	HPAH (Total)	1921		µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	Krone	Butyltin	5		µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	Krone	Dibutyltin	24		µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	Krone	Tetrabutyltin	1.4	U	µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	Krone	Tributyltin	67		µg/kg
SDC-SS06-000007	3/13/2003 15:05	Sediment	PSEP	Clay (percent)	14.5		%
SDC-SS06-000007	3/13/2003 15:05	Sediment	PSEP	Coarse Sand	0.81		%
SDC-SS06-000007	3/13/2003 15:05	Sediment	PSEP	Fine Sand	11.4		%
SDC-SS06-000007	3/13/2003 15:05	Sediment	PSEP	Gravel (percent)	0.05		%
SDC-SS06-000007	3/13/2003 15:05	Sediment	PSEP	Medium Sand	11		%
SDC-SS06-000007	3/13/2003 15:05	Sediment	PSEP	Silt (percent)	47.6		%
SDC-SS06-000007	3/13/2003 15:05	Sediment	PSEP	Very Coarse Sand	0.18		%
SDC-SS06-000007	3/13/2003 15:05	Sediment	PSEP	Very Fine Sand	13.3		%
SDC-SS06-000007	3/13/2003 15:05	Sediment	PSEP	Total Organic Carbon (TOC)	1.21		%
SDC-SS06-008010C	3/13/2003 15:05	Sediment	200.8	Antimony (total)	0.05	J	mg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	200.8	Arsenic (total)	1.1		mg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	200.8	Cadmium (total)	0.05	J	mg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	200.8	Copper (total)	12.2		mg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	200.8	Lead (total)	2.47		mg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	200.8	Nickel (total)	15		mg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	200.8	Silver (total)	0.02	J	mg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	200.8	Zinc (total)	33.8		mg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	7471A	Mercury (total)	0.01	J	mg/kg
SDC-SS06-008010C	3/12/2003 16:45	Sediment	8081A	4,4'-DDD	0.11	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8081A	4,4'-DDE	0.13	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8081A	4,4'-DDT	0.22	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8081A	Aldrin	0.12	U	µg/kg

Table 3.1
Results of Conventional and Chemical Analyses

Sample ID	Collection Date	Matrix	Analysis	Analyte	Conc	Interpretive Qualifier	Unit
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8081A	alpha-Chlordane	0.13	U	µg/kg
SDC-SS06-008010C	3/12/2003 16:45	Sediment	8081A	DDTs (total-calc'd p,p')	0.22	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8081A	Dieldrin	0.14	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8081A	gamma-BHC	0.22	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8081A	Heptachlor	0.21	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8082	PCB-1016	2.3	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8082	PCB-1221	2.3	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8082	PCB-1232	2.3	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8082	PCB-1242	2.3	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8082	PCB-1248	2.3	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8082	PCB-1254	2.3	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8082	PCB-1260	2.3	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8082	PCBs (total)	2.3	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	1,2,4-Trichlorobenzene	2	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	1,2-Dichlorobenzene	1.7	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	1,3-Dichlorobenzene	2.1	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	1,4-Dichlorobenzene	2.5	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	2,4-Dimethylphenol	7	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	2-Methylnaphthalene	1.6	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	2-Methylphenol	4.4	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	4-Methylphenol	3.7	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	Acenaphthene	1.3	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	Acenaphthylene	1.8	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	Anthracene	3	J	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	Benzo(a)anthracene	11		µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	Benzo(a)pyrene	6.6	J	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	Benzo(b)fluoranthene	9.2	J	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	Benzo(g,h,i)perylene	6.3	J	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	Benzo(k)fluoranthene	9.2	J	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	Benzo(b+k)fluoranthene	18.4	J	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	Benzoic acid	130	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	Benzyl alcohol	4.7	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	bis(2-ethylhexyl)phthalate	24	J	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	Butyl benzyl phthalate	2	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	Chrysene	12		µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	Dibenzo(a,h)anthracene	2.8	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	Dibenzofuran	2.1	J	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	Diethylphthalate	4.5	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	Dimethyl phthalate	2.3	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	Di-n-butyl phthalate	3.3	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	Di-n-octyl phthalate	1.6	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	Fluoranthene	31		µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	Fluorene	2.2	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	Hexachlorobenzene	2.7	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	Hexachlorobutadiene	1.8	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	Hexachloroethane	2.8	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	Indeno(1,2,3-cd)pyrene	6.7	J	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	Naphthalene	2.4	J	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	N-Nitrosodiphenylamine	2.8	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	Pentachlorophenol	11	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	Phenanthrene	30		µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	Phenol	2.5	U	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	Pyrene	20		µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	LPAH (Total)	35.4	J	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	8270C	HPAH (Total)	112	J	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	Krone	Butyltin	0.6	UJ	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	Krone	Dibutyltin	0.93	UJ	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	Krone	Tetrabutyltin	1.1	UJ	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	Krone	Tributyltin	0.46	UJ	µg/kg
SDC-SS06-008010C	3/13/2003 15:05	Sediment	PSEP	Clay (percent)	0.6		%
SDC-SS06-008010C	3/13/2003 15:05	Sediment	PSEP	Coarse Sand	12.7		%
SDC-SS06-008010C	3/13/2003 15:05	Sediment	PSEP	Fine Sand	13.6		%
SDC-SS06-008010C	3/13/2003 15:05	Sediment	PSEP	Gravel (percent)	0.01		%
SDC-SS06-008010C	3/13/2003 15:05	Sediment	PSEP	Medium Sand	69.4		%
SDC-SS06-008010C	3/13/2003 15:05	Sediment	PSEP	Silt (percent)	2.42		%
SDC-SS06-008010C	3/13/2003 15:05	Sediment	PSEP	Very Coarse Sand	0.12		%
SDC-SS06-008010C	3/13/2003 15:05	Sediment	PSEP	Very Fine Sand	1.59		%
SDC-SS06-008010C	3/13/2003 15:05	Sediment	PSEP	Total Organic Carbon (TOC)	0.1		%

Notes:
In the case of non-detects, the method detection limit is reported.
LPAH is a sum of naphthalene, acenaphthylene, acenaphthene, fluorene, phenanthrene, anthracene and 2-methylnaphthalene
HPAH is a sum of fluoranthene, pyrene, benz(a)anthracene, chrysene, benzo(b+k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-c,d)pyrene, dibenz(a)anthraceneand benzo(g,h,l)perylene

Table 3.2
PAH Screening Results

SampleID	Collection Date	Matrix	Analysis	Analyte	Conc.	Interpretive Qualifier	Unit Name
SDC-SS01-007008	3/12/2003 15:16	Sediment	8270C SIM	2-Methylnaphthalene	0.28	U	µg/kg
SDC-SS01-007008	3/12/2003 15:16	Sediment	8270C SIM	Acenaphthene	0.28	U	µg/kg
SDC-SS01-007008	3/12/2003 15:16	Sediment	8270C SIM	Acenaphthylene	0.21	U	µg/kg
SDC-SS01-007008	3/12/2003 15:16	Sediment	8270C SIM	Anthracene	0.25	U	µg/kg
SDC-SS01-007008	3/12/2003 15:16	Sediment	8270C SIM	Benzo(a)anthracene	0.17	U	µg/kg
SDC-SS01-007008	3/12/2003 15:16	Sediment	8270C SIM	Benzo(a)pyrene	19.1	U	µg/kg
SDC-SS01-007008	3/12/2003 15:16	Sediment	8270C SIM	Benzo(b)fluoranthene	0.19	U	µg/kg
SDC-SS01-007008	3/12/2003 15:16	Sediment	8270C SIM	Benzo(g,h,i)perylene	0.31	J	µg/kg
SDC-SS01-007008	3/12/2003 15:16	Sediment	8270C SIM	Benzo(k)fluoranthene	0.2	U	µg/kg
SDC-SS01-007008	3/12/2003 15:16	Sediment	8270C SIM	Chrysene	0.2	U	µg/kg
SDC-SS01-007008	3/12/2003 15:16	Sediment	8270C SIM	Dibenzo(a,h)anthracene	0.24	U	µg/kg
SDC-SS01-007008	3/12/2003 15:16	Sediment	8270C SIM	Dibenzofuran	0.27	U	µg/kg
SDC-SS01-007008	3/12/2003 15:16	Sediment	8270C SIM	Fluoranthene	0.23	U	µg/kg
SDC-SS01-007008	3/12/2003 15:16	Sediment	8270C SIM	Fluorene	0.23	U	µg/kg
SDC-SS01-007008	3/12/2003 15:16	Sediment	8270C SIM	Indeno(1,2,3-cd)pyrene	0.2	U	µg/kg
SDC-SS01-007008	3/12/2003 15:16	Sediment	8270C SIM	Naphthalene	0.28	U	µg/kg
SDC-SS01-007008	3/12/2003 15:16	Sediment	8270C SIM	Phenanthrene	0.2	U	µg/kg
SDC-SS01-007008	3/12/2003 15:16	Sediment	8270C SIM	Pyrene	0.15	U	µg/kg
SDC-SS01-010011	3/12/2003 15:16	Sediment	8270C SIM	2-Methylnaphthalene	0.28	U	µg/kg
SDC-SS01-010011	3/12/2003 15:16	Sediment	8270C SIM	Acenaphthene	0.28	U	µg/kg
SDC-SS01-010011	3/12/2003 15:16	Sediment	8270C SIM	Acenaphthylene	0.21	U	µg/kg
SDC-SS01-010011	3/12/2003 15:16	Sediment	8270C SIM	Anthracene	0.25	U	µg/kg
SDC-SS01-010011	3/12/2003 15:16	Sediment	8270C SIM	Benzo(a)anthracene	0.17	U	µg/kg
SDC-SS01-010011	3/12/2003 15:16	Sediment	8270C SIM	Benzo(a)pyrene	0.19	U	µg/kg
SDC-SS01-010011	3/12/2003 15:16	Sediment	8270C SIM	Benzo(b)fluoranthene	0.19	U	µg/kg
SDC-SS01-010011	3/12/2003 15:16	Sediment	8270C SIM	Benzo(g,h,i)perylene	0.14	U	µg/kg
SDC-SS01-010011	3/12/2003 15:16	Sediment	8270C SIM	Benzo(k)fluoranthene	0.2	U	µg/kg
SDC-SS01-010011	3/12/2003 15:16	Sediment	8270C SIM	Chrysene	0.2	U	µg/kg
SDC-SS01-010011	3/12/2003 15:16	Sediment	8270C SIM	Dibenzo(a,h)anthracene	0.24	U	µg/kg
SDC-SS01-010011	3/12/2003 15:16	Sediment	8270C SIM	Dibenzofuran	0.27	U	µg/kg
SDC-SS01-010011	3/12/2003 15:16	Sediment	8270C SIM	Fluoranthene	0.23	U	µg/kg
SDC-SS01-010011	3/12/2003 15:16	Sediment	8270C SIM	Fluorene	0.23	U	µg/kg
SDC-SS01-010011	3/12/2003 15:16	Sediment	8270C SIM	Indeno(1,2,3-cd)pyrene	0.2	U	µg/kg
SDC-SS01-010011	3/12/2003 15:16	Sediment	8270C SIM	Naphthalene	0.28	U	µg/kg
SDC-SS01-010011	3/12/2003 15:16	Sediment	8270C SIM	Phenanthrene	0.2	U	µg/kg
SDC-SS01-010011	3/12/2003 15:16	Sediment	8270C SIM	Pyrene	0.15	U	µg/kg
SDC-SS02-013014	3/12/2003 16:45	Sediment	8270C SIM	2-Methylnaphthalene	38		µg/kg
SDC-SS02-013014	3/12/2003 16:45	Sediment	8270C SIM	Acenaphthene	35		µg/kg
SDC-SS02-013014	3/12/2003 16:45	Sediment	8270C SIM	Acenaphthylene	37		µg/kg
SDC-SS02-013014	3/12/2003 16:45	Sediment	8270C SIM	Anthracene	85		µg/kg
SDC-SS02-013014	3/12/2003 16:45	Sediment	8270C SIM	Benzo(a)anthracene	230		µg/kg
SDC-SS02-013014	3/12/2003 16:45	Sediment	8270C SIM	Benzo(a)pyrene	420		µg/kg
SDC-SS02-013014	3/12/2003 16:45	Sediment	8270C SIM	Benzo(b)fluoranthene	260		µg/kg
SDC-SS02-013014	3/12/2003 16:45	Sediment	8270C SIM	Benzo(g,h,i)perylene	370		µg/kg
SDC-SS02-013014	3/12/2003 16:45	Sediment	8270C SIM	Benzo(k)fluoranthene	220		µg/kg
SDC-SS02-013014	3/12/2003 16:45	Sediment	8270C SIM	Chrysene	300		µg/kg
SDC-SS02-013014	3/12/2003 16:45	Sediment	8270C SIM	Dibenzo(a,h)anthracene	26		µg/kg
SDC-SS02-013014	3/12/2003 16:45	Sediment	8270C SIM	Dibenzofuran	13		µg/kg
SDC-SS02-013014	3/12/2003 16:45	Sediment	8270C SIM	Fluoranthene	660		µg/kg
SDC-SS02-013014	3/12/2003 16:45	Sediment	8270C SIM	Fluorene	37		µg/kg
SDC-SS02-013014	3/12/2003 16:45	Sediment	8270C SIM	Indeno(1,2,3-cd)pyrene	350		µg/kg
SDC-SS02-013014	3/12/2003 16:45	Sediment	8270C SIM	Naphthalene	180		µg/kg
SDC-SS02-013014	3/12/2003 16:45	Sediment	8270C SIM	Phenanthrene	380		µg/kg
SDC-SS02-013014	3/12/2003 16:45	Sediment	8270C SIM	Pyrene	950		µg/kg
SDC-SS02-016017	3/12/2003 16:45	Sediment	8270C SIM	2-Methylnaphthalene	0.65	J	µg/kg
SDC-SS02-016017	3/12/2003 16:45	Sediment	8270C SIM	Acenaphthene	0.33	J	µg/kg
SDC-SS02-016017	3/12/2003 16:45	Sediment	8270C SIM	Acenaphthylene	1	J	µg/kg
SDC-SS02-016017	3/12/2003 16:45	Sediment	8270C SIM	Anthracene	3.6	J	µg/kg
SDC-SS02-016017	3/12/2003 16:45	Sediment	8270C SIM	Benzo(a)anthracene	11		µg/kg
SDC-SS02-016017	3/12/2003 16:45	Sediment	8270C SIM	Benzo(a)pyrene	12		µg/kg
SDC-SS02-016017	3/12/2003 16:45	Sediment	8270C SIM	Benzo(b)fluoranthene	7.9		µg/kg
SDC-SS02-016017	3/12/2003 16:45	Sediment	8270C SIM	Benzo(g,h,i)perylene	8.2		µg/kg
SDC-SS02-016017	3/12/2003 16:45	Sediment	8270C SIM	Benzo(k)fluoranthene	8.6		µg/kg
SDC-SS02-016017	3/12/2003 16:45	Sediment	8270C SIM	Chrysene	13		µg/kg
SDC-SS02-016017	3/12/2003 16:45	Sediment	8270C SIM	Dibenzo(a,h)anthracene	0.98	J	µg/kg
SDC-SS02-016017	3/12/2003 16:45	Sediment	8270C SIM	Dibenzofuran	0.32	J	µg/kg
SDC-SS02-016017	3/12/2003 16:45	Sediment	8270C SIM	Fluoranthene	19		µg/kg
SDC-SS02-016017	3/12/2003 16:45	Sediment	8270C SIM	Fluorene	0.76	J	µg/kg

Table 3.2
PAH Screening Results

SampleID	Collection Date	Matrix	Analysis	Analyte	Conc.	Interpretive Qualifier	Unit Name
SDC-SS02-016017	3/12/2003 16:45	Sediment	8270C SIM	Indeno(1,2,3-cd)pyrene	7.2		µg/kg
SDC-SS02-016017	3/12/2003 16:45	Sediment	8270C SIM	Naphthalene	5	J	µg/kg
SDC-SS02-016017	3/12/2003 16:45	Sediment	8270C SIM	Phenanthrene	9.7		µg/kg
SDC-SS02-016017	3/12/2003 16:45	Sediment	8270C SIM	Pyrene	26		µg/kg
SDC-SS03R2-001002	3/12/2003 12:45	Sediment	8270C SIM	2-Methylnaphthalene	0.27	U	µg/kg
SDC-SS03R2-001002	3/12/2003 12:45	Sediment	8270C SIM	Acenaphthene	0.27	U	µg/kg
SDC-SS03R2-001002	3/12/2003 12:45	Sediment	8270C SIM	Acenaphthylene	0.21	U	µg/kg
SDC-SS03R2-001002	3/12/2003 12:45	Sediment	8270C SIM	Anthracene	0.39	J	µg/kg
SDC-SS03R2-001002	3/12/2003 12:45	Sediment	8270C SIM	Benzo(a)anthracene	1.3	J	µg/kg
SDC-SS03R2-001002	3/12/2003 12:45	Sediment	8270C SIM	Benzo(a)pyrene	1.4	J	µg/kg
SDC-SS03R2-001002	3/12/2003 12:45	Sediment	8270C SIM	Benzo(b)fluoranthene	1.3	J	µg/kg
SDC-SS03R2-001002	3/12/2003 12:45	Sediment	8270C SIM	Benzo(g,h,i)perylene	1.7	J	µg/kg
SDC-SS03R2-001002	3/12/2003 12:45	Sediment	8270C SIM	Benzo(k)fluoranthene	1.3	J	µg/kg
SDC-SS03R2-001002	3/12/2003 12:45	Sediment	8270C SIM	Chrysene	1.9	J	µg/kg
SDC-SS03R2-001002	3/12/2003 12:45	Sediment	8270C SIM	Dibenzo(a,h)anthracene	0.37	J	µg/kg
SDC-SS03R2-001002	3/12/2003 12:45	Sediment	8270C SIM	Dibenzofuran	0.26	U	µg/kg
SDC-SS03R2-001002	3/12/2003 12:45	Sediment	8270C SIM	Fluoranthene	2.3	J	µg/kg
SDC-SS03R2-001002	3/12/2003 12:45	Sediment	8270C SIM	Fluorene	0.22	U	µg/kg
SDC-SS03R2-001002	3/12/2003 12:45	Sediment	8270C SIM	Indeno(1,2,3-cd)pyrene	1.6	J	µg/kg
SDC-SS03R2-001002	3/12/2003 12:45	Sediment	8270C SIM	Naphthalene	0.43	J	µg/kg
SDC-SS03R2-001002	3/12/2003 12:45	Sediment	8270C SIM	Phenanthrene	1.1	J	µg/kg
SDC-SS03R2-001002	3/12/2003 12:45	Sediment	8270C SIM	Pyrene	2.9	J	µg/kg
SDC-SS03R2-005006	3/12/2003 12:45	Sediment	8270C SIM	2-Methylnaphthalene	0.28	U	µg/kg
SDC-SS03R2-005006	3/12/2003 12:45	Sediment	8270C SIM	Acenaphthene	0.28	U	µg/kg
SDC-SS03R2-005006	3/12/2003 12:45	Sediment	8270C SIM	Acenaphthylene	0.22	U	µg/kg
SDC-SS03R2-005006	3/12/2003 12:45	Sediment	8270C SIM	Anthracene	0.26	U	µg/kg
SDC-SS03R2-005006	3/12/2003 12:45	Sediment	8270C SIM	Benzo(a)anthracene	0.18	U	µg/kg
SDC-SS03R2-005006	3/12/2003 12:45	Sediment	8270C SIM	Benzo(a)pyrene	0.19	U	µg/kg
SDC-SS03R2-005006	3/12/2003 12:45	Sediment	8270C SIM	Benzo(b)fluoranthene	0.19	U	µg/kg
SDC-SS03R2-005006	3/12/2003 12:45	Sediment	8270C SIM	Benzo(g,h,i)perylene	0.74	J	µg/kg
SDC-SS03R2-005006	3/12/2003 12:45	Sediment	8270C SIM	Benzo(k)fluoranthene	0.2	U	µg/kg
SDC-SS03R2-005006	3/12/2003 12:45	Sediment	8270C SIM	Chrysene	0.2	U	µg/kg
SDC-SS03R2-005006	3/12/2003 12:45	Sediment	8270C SIM	Dibenzo(a,h)anthracene	0.49	J	µg/kg
SDC-SS03R2-005006	3/12/2003 12:45	Sediment	8270C SIM	Dibenzofuran	0.27	U	µg/kg
SDC-SS03R2-005006	3/12/2003 12:45	Sediment	8270C SIM	Fluoranthene	0.23	U	µg/kg
SDC-SS03R2-005006	3/12/2003 12:45	Sediment	8270C SIM	Fluorene	0.23	U	µg/kg
SDC-SS03R2-005006	3/12/2003 12:45	Sediment	8270C SIM	Indeno(1,2,3-cd)pyrene	0.69	J	µg/kg
SDC-SS03R2-005006	3/12/2003 12:45	Sediment	8270C SIM	Naphthalene	0.28	U	µg/kg
SDC-SS03R2-005006	3/12/2003 12:45	Sediment	8270C SIM	Phenanthrene	0.2	U	µg/kg
SDC-SS03R2-005006	3/12/2003 12:45	Sediment	8270C SIM	Pyrene	0.15	U	µg/kg
SDC-SS05-012013	3/11/2003 17:00	Sediment	8270C SIM	2-Methylnaphthalene	0.28	U	µg/kg
SDC-SS05-012013	3/11/2003 17:00	Sediment	8270C SIM	Acenaphthene	0.28	U	µg/kg
SDC-SS05-012013	3/11/2003 17:00	Sediment	8270C SIM	Acenaphthylene	0.22	U	µg/kg
SDC-SS05-012013	3/11/2003 17:00	Sediment	8270C SIM	Anthracene	0.26	U	µg/kg
SDC-SS05-012013	3/11/2003 17:00	Sediment	8270C SIM	Benzo(a)anthracene	0.18	U	µg/kg
SDC-SS05-012013	3/11/2003 17:00	Sediment	8270C SIM	Benzo(a)pyrene	0.19	U	µg/kg
SDC-SS05-012013	3/11/2003 17:00	Sediment	8270C SIM	Benzo(b)fluoranthene	0.19	U	µg/kg
SDC-SS05-012013	3/11/2003 17:00	Sediment	8270C SIM	Benzo(g,h,i)perylene	0.14	U	µg/kg
SDC-SS05-012013	3/11/2003 17:00	Sediment	8270C SIM	Benzo(k)fluoranthene	0.2	U	µg/kg
SDC-SS05-012013	3/11/2003 17:00	Sediment	8270C SIM	Chrysene	0.2	U	µg/kg
SDC-SS05-012013	3/11/2003 17:00	Sediment	8270C SIM	Dibenzo(a,h)anthracene	0.24	U	µg/kg
SDC-SS05-012013	3/11/2003 17:00	Sediment	8270C SIM	Dibenzofuran	0.27	U	µg/kg
SDC-SS05-012013	3/11/2003 17:00	Sediment	8270C SIM	Fluoranthene	0.23	U	µg/kg
SDC-SS05-012013	3/11/2003 17:00	Sediment	8270C SIM	Fluorene	0.23	U	µg/kg
SDC-SS05-012013	3/11/2003 17:00	Sediment	8270C SIM	Indeno(1,2,3-cd)pyrene	0.2	U	µg/kg
SDC-SS05-012013	3/11/2003 17:00	Sediment	8270C SIM	Naphthalene	0.28	U	µg/kg
SDC-SS05-012013	3/11/2003 17:00	Sediment	8270C SIM	Phenanthrene	0.2	U	µg/kg
SDC-SS05-012013	3/11/2003 17:00	Sediment	8270C SIM	Pyrene	0.15	U	µg/kg
SDC-SS05-015016	3/11/2003 17:00	Sediment	8270C SIM	2-Methylnaphthalene	0.28	U	µg/kg
SDC-SS05-015016	3/11/2003 17:00	Sediment	8270C SIM	Acenaphthene	0.28	U	µg/kg
SDC-SS05-015016	3/11/2003 17:00	Sediment	8270C SIM	Acenaphthylene	0.21	U	µg/kg
SDC-SS05-015016	3/11/2003 17:00	Sediment	8270C SIM	Anthracene	0.25	U	µg/kg
SDC-SS05-015016	3/11/2003 17:00	Sediment	8270C SIM	Benzo(a)anthracene	0.17	U	µg/kg
SDC-SS05-015016	3/11/2003 17:00	Sediment	8270C SIM	Benzo(a)pyrene	0.19	U	µg/kg
SDC-SS05-015016	3/11/2003 17:00	Sediment	8270C SIM	Benzo(b)fluoranthene	0.19	U	µg/kg
SDC-SS05-015016	3/11/2003 17:00	Sediment	8270C SIM	Benzo(g,h,i)perylene	0.78	J	µg/kg
SDC-SS05-015016	3/11/2003 17:00	Sediment	8270C SIM	Benzo(k)fluoranthene	0.2	U	µg/kg
SDC-SS05-015016	3/11/2003 17:00	Sediment	8270C SIM	Chrysene	0.2	U	µg/kg

Table 3.2
PAH Screening Results

SampleID	Collection Date	Matrix	Analysis	Analyte	Conc.	Interpretive Qualifier	Unit Name
SDC-SS05-015016	3/11/2003 17:00	Sediment	8270C SIM	Dibenzo(a,h)anthracene	0.35	J	µg/kg
SDC-SS05-015016	3/11/2003 17:00	Sediment	8270C SIM	Dibenzofuran	0.26	U	µg/kg
SDC-SS05-015016	3/11/2003 17:00	Sediment	8270C SIM	Fluoranthene	0.22	U	µg/kg
SDC-SS05-015016	3/11/2003 17:00	Sediment	8270C SIM	Fluorene	0.22	U	µg/kg
SDC-SS05-015016	3/11/2003 17:00	Sediment	8270C SIM	Indeno(1,2,3-cd)pyrene	0.8	J	µg/kg
SDC-SS05-015016	3/11/2003 17:00	Sediment	8270C SIM	Naphthalene	0.28	U	µg/kg
SDC-SS05-015016	3/11/2003 17:00	Sediment	8270C SIM	Phenanthrene	0.2	U	µg/kg
SDC-SS05-015016	3/11/2003 17:00	Sediment	8270C SIM	Pyrene	0.15	U	µg/kg
SDC-SS06-007008	3/13/2003 15:05	Sediment	8270C SIM	2-Methylnaphthalene	7.1		µg/kg
SDC-SS06-007008	3/13/2003 15:05	Sediment	8270C SIM	Acenaphthene	7.5		µg/kg
SDC-SS06-007008	3/13/2003 15:05	Sediment	8270C SIM	Acenaphthylene	11		µg/kg
SDC-SS06-007008	3/13/2003 15:05	Sediment	8270C SIM	Anthracene	21		µg/kg
SDC-SS06-007008	3/13/2003 15:05	Sediment	8270C SIM	Benzo(a)anthracene	120		µg/kg
SDC-SS06-007008	3/13/2003 15:05	Sediment	8270C SIM	Benzo(a)pyrene	220		µg/kg
SDC-SS06-007008	3/13/2003 15:05	Sediment	8270C SIM	Benzo(b)fluoranthene	160		µg/kg
SDC-SS06-007008	3/13/2003 15:05	Sediment	8270C SIM	Benzo(g,h,i)perylene	180		µg/kg
SDC-SS06-007008	3/13/2003 15:05	Sediment	8270C SIM	Benzo(k)fluoranthene	130		µg/kg
SDC-SS06-007008	3/13/2003 15:05	Sediment	8270C SIM	Chrysene	170		µg/kg
SDC-SS06-007008	3/13/2003 15:05	Sediment	8270C SIM	Dibenzo(a,h)anthracene	22		µg/kg
SDC-SS06-007008	3/13/2003 15:05	Sediment	8270C SIM	Dibenzofuran	3.2	J	µg/kg
SDC-SS06-007008	3/13/2003 15:05	Sediment	8270C SIM	Fluoranthene	230		µg/kg
SDC-SS06-007008	3/13/2003 15:05	Sediment	8270C SIM	Fluorene	6.7		µg/kg
SDC-SS06-007008	3/13/2003 15:05	Sediment	8270C SIM	Indeno(1,2,3-cd)pyrene	180		µg/kg
SDC-SS06-007008	3/13/2003 15:05	Sediment	8270C SIM	Naphthalene	19		µg/kg
SDC-SS06-007008	3/13/2003 15:05	Sediment	8270C SIM	Phenanthrene	90		µg/kg
SDC-SS06-007008	3/13/2003 15:05	Sediment	8270C SIM	Pyrene	360		µg/kg
SDC-SS06-010011	3/13/2003 15:05	Sediment	8270C SIM	2-Methylnaphthalene	0.28	U	µg/kg
SDC-SS06-010011	3/13/2003 15:05	Sediment	8270C SIM	Acenaphthene	0.28	U	µg/kg
SDC-SS06-010011	3/13/2003 15:05	Sediment	8270C SIM	Acenaphthylene	0.22	U	µg/kg
SDC-SS06-010011	3/13/2003 15:05	Sediment	8270C SIM	Anthracene	0.25	U	µg/kg
SDC-SS06-010011	3/13/2003 15:05	Sediment	8270C SIM	Benzo(a)anthracene	0.18	U	µg/kg
SDC-SS06-010011	3/13/2003 15:05	Sediment	8270C SIM	Benzo(a)pyrene	0.19	U	µg/kg
SDC-SS06-010011	3/13/2003 15:05	Sediment	8270C SIM	Benzo(b)fluoranthene	0.19	U	µg/kg
SDC-SS06-010011	3/13/2003 15:05	Sediment	8270C SIM	Benzo(g,h,i)perylene	0.22	J	µg/kg
SDC-SS06-010011	3/13/2003 15:05	Sediment	8270C SIM	Benzo(k)fluoranthene	0.2	U	µg/kg
SDC-SS06-010011	3/13/2003 15:05	Sediment	8270C SIM	Chrysene	0.2	U	µg/kg
SDC-SS06-010011	3/13/2003 15:05	Sediment	8270C SIM	Dibenzo(a,h)anthracene	0.24	U	µg/kg
SDC-SS06-010011	3/13/2003 15:05	Sediment	8270C SIM	Dibenzofuran	0.27	U	µg/kg
SDC-SS06-010011	3/13/2003 15:05	Sediment	8270C SIM	Fluoranthene	0.23	U	µg/kg
SDC-SS06-010011	3/13/2003 15:05	Sediment	8270C SIM	Fluorene	0.23	U	µg/kg
SDC-SS06-010011	3/13/2003 15:05	Sediment	8270C SIM	Indeno(1,2,3-cd)pyrene	0.21	J	µg/kg
SDC-SS06-010011	3/13/2003 15:05	Sediment	8270C SIM	Naphthalene	0.3	J	µg/kg
SDC-SS06-010011	3/13/2003 15:05	Sediment	8270C SIM	Phenanthrene	0.3	J	µg/kg
SDC-SS06-010011	3/13/2003 15:05	Sediment	8270C SIM	Pyrene	0.22	J	µg/kg

Table 3.3
Comparison to Dredge Material Evaluation Framework Criteria

Sample ID	Analyte	Conc.	Interpretive Qualifier	Unit Name	Ratio of Exeedance	
					DMEF BT	DMEF SL
SDC-SS01-000007	DDTs (total-calc'd p,p')	10.2	J	µg/kg		1.48
SDC-SS02-000013	Benzo(g,h,i)perylene	740		µg/kg		1.1
SDC-SS02-000013	DDTs (total-calc'd p,p')	37	J	µg/kg		5.36
SDC-SS02-000013	Indeno(1,2,3-cd)pyrene	620		µg/kg		1.03
SDC-SS02-000013	PCBs (total)	190	J	µg/kg		1.46
SDC-SS06-000007	PCBs (total)	300		µg/kg		2.31

Note:
Only exceedances of criteria are shown, i.e., when ratio of exceedance is greater than one.

Table 3.4
Comparison to Freshwater Sediment Quality Values

Sample ID	Analyte	Conc.	Interpretive Qualifier	Unit Name	Ratio of Exeedance Ingersoll PEC
SDC-SS02-000013	Naphthalene	740		µg/kg	1.32
SDC-SS02-000013	Phenanthrene	1400		µg/kg	1.2
SDC-SS02-000013	Pyrene	2100		µg/kg	1.38

Notes:
PEC values from Ingersoll et al 2000 and MacDonald et al 2000.
Only exceedances of criteria are shown, i.e., when ratio of exceedance is greater than one.

Table 3.5
Portland Harbor "Baseline" Values

Parameter	Apparent Portland Harbor Sediment Baseline Maximum Value	Sediment Concentrations From the Initial Study Area (LWG 2002)			Subsurface Sediment Concentrations in Portland Harbor (Weston 1997)	
		Detection Frequency	Minimum	Maximum	Arithmetic Mean	Median Value
Conventionals						
Total Organic Carbon (%)	2				2.0	1.8
Metals (mg/kg)						
Antimony	<5	35.7	0.02	13	3.2	2.5
Arsenic	<5	61.0	0.001	140	3.5	2.5
Cadmium	0.6	92.6	0.05	6.6	0.8	0.6
Copper	60	100	0.002	2200	85.9	53.6
Lead	30	95.8	0.01	1160	78.2	28.0
Mercury	0.1	88.6	0.01	2.1	0.18	0.12
Nickel	32	100	0.01	594	31.9	31.0
Silver	1.4	87.2	0.0002	3.4	1.3	1.3
Zinc	118	100	0.005	2700	205.8	157.0
Organometallic compounds (µg/kg)						
Tributyltin	300[1]	89.8[2]	1[2]	42900[2]	1311.8[2]	84.6[2]
Organics (µg/kg)						
Total LPAH[3]	700	88.0	1.7	4299000	8224.729	1451.0
Naphthalene		53.2	0.2	1900000	443.8	130.0
Acenaphthylene		28	8800	9000	87.4	31.0
Acenaphthene		58.5	0.4	580000	994.97	220.0
Fluorene		58.9	0.5	260000	804.5	160.0
Phenanthrene		88.2	0.4	1300000	5156.6	820.0
Anthracene		64.2	0.8	250000	809.6	160.0

Table 3.5
Portland Harbor "Baseline" Values

Parameter	Apparent Portland Harbor Sediment Baseline Maximum Value	Sediment Concentrations From the Initial Study Area (LWG 2002)			Subsurface Sediment Concentrations in Portland Harbor (Weston 1997)	
		Detection Frequency	Minimum	Maximum	Arithmetic Mean	Median Value
2-Methylnaphthalene	150	42.5	1	44000	300.4	79.0
Total HPAH[4]	2400	95.0	2	1893000	19623.7	3187.0
Fluoranthene		94.7	0.7	480000	4307.0	1000.0
Pyrene		94.6	0.1	670000	5033.97	1000.0
Benz(a)anthracene		87.8	3	120000	1318.0	390.0
Chrysene		91.9	3	160000	1755.4	455.0
Benzofluoranthenes (b+k)		92.9	4	157000	2561.1	455.0
Benzo(a)pyrene		87.6	0.5	130000	1711.9	380.0
Indeno(1,2,3-c,d)pyrene		81.5	1	110000	1226.6	220.0
Dibenz(a,h)anthracene		48.5	0.7	25000	348.0	53.0
Benzo(g,h,I)perylene		80.8	0.6	6.3	1465.9	260.0
Chlorinated hydrocarbons (µg/kg)						
1,3-Dichlorbenzene		0.82	10	31	28.7	10.0
1,4-Dichlorobenzene		0.82	18	230	28.7	10.0
1,2-Dichlorobenzene		0.82	11	22	28.7	10.0
1,2,4-Trichlorobenzene		2.13	10	530	28.7	10.0
Hexachlorobenzene		2.26	19	14000	68.6	10.0
Phthalates (µg/kg)						
Dimethyl phthalate	<20	5.82	3.1	171	30.0	10.0
Diethyl phthalate		1.27	15.6	26.5	28.7	10.0
Di-n-butyl phthalate	<20	26.4	4.4	1500	32.8	10.0
Butyl benzyl phthalate	<20	31.1	3.4	3000	33.6	10.0

Table 3.5
Portland Harbor "Baseline" Values

Parameter	Apparent Portland Harbor Sediment Baseline Maximum Value	Sediment Concentrations From the Initial Study Area (LWG 2002)			Subsurface Sediment Concentrations In Portland Harbor (Weston 1997)	
		Detection Frequency	Minimum	Maximum	Arithmetic Mean	Median Value
Bis(2-ethylhexyl) phthalate	390	66.8	11	38000	379.3	210.0
Di-n-octyl phthalate	<20	15.9	11	10100	28.7	10.0
Phenols (µg/kg)						
Phenol	<20	4.39	5.1	300	39.1	10.0
2-Methylphenol		0.52	17	51	28.7	10.0
4-Methylphenol	680	46.6	20	1400	151.3	120.0
2,4-Dimethylphenol		0.775	31	6000	28.7	10.0
Pentachlorophenol	Detect	3.11	9.4	680	137.6	49.0
Misc. extractables (µg/kg)						
Benzyl alcohol	<20	2.90	5.5	15	28.6	10.0
Benzoic acid	<200	6.60	8.7	2600	534.2	365.0
Dibenzofuran	100	43.9	2	13900	291.2	59.0
Hexachloroethane		4.03	31	20000	569.8	10.0
Hexachlorobutadiene		2.17	19	34000	946.9	10.0
N-Nitrosodiphenylamine					28.7	10.0
Pesticides (µg/kg)						
Total DDT (4,4'-DDD, 4,4'-DDE, 4,4'-DDT)	220	72.8	1.2	84909		
4,4'-DDD		62.5	0.4	29000	1762.2	7.8
4,4'-DDE		50.3	0.7	1840	213.0	2.8
4,4'-DDT		56.5	0.2	81000	1267.6	14.5
Aldrin		6.56	0.2	60	107.1	0.5

Table 3.5
Portland Harbor "Baseline" Values

Parameter	Apparent Portland Harbor Sediment Baseline Maximum Value	Sediment Concentrations From the Initial Study Area (LWG 2002)			Subsurface Sediment Concentrations in Portland Harbor (Weston 1997)	
		Detection Frequency	Minimum	Maximum	Arithmetic Mean	Median Value
Alpha-Chlordane					107.1	0.5
Dieldrin		3.83	0.4	10	211.4	1.0
Heptachlor		0.55	6	6	107.1	0.5
Gamma-BHC (Lindane)					107.1	0.5
Total PCBs	<180	45.0	3	2500	3818.7	72.0

Notes:

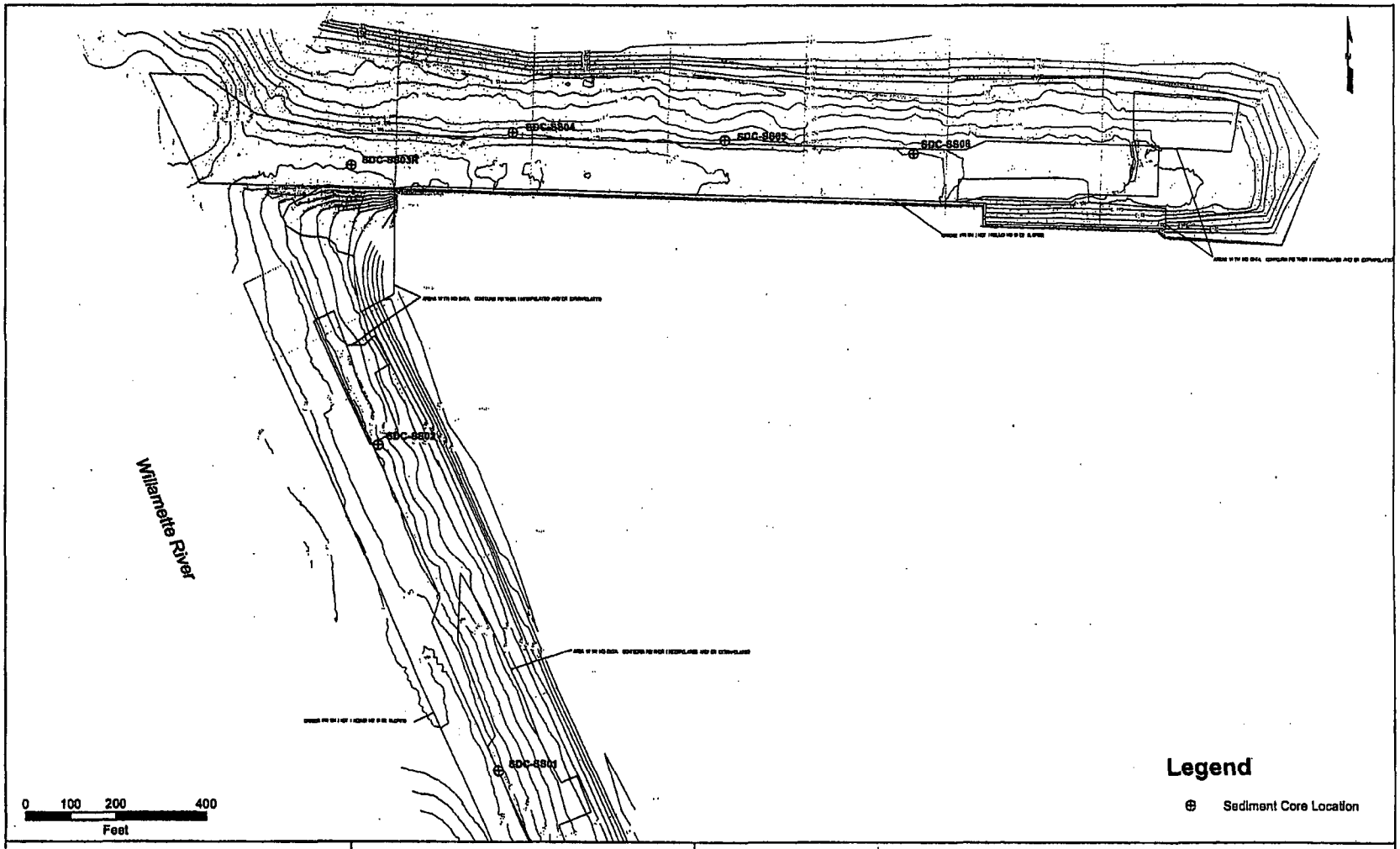
1 This value is for total organotins, a sum of tetra-n-butyltin, tri-n-butyltin, di-n-butyltin and n-butyltin.
2 These values are for tri-n-butyltin ion.
3 Compounds that are included in the sum of LPAH may vary among the different sources.
4 Compounds that are included in the sum of HPAH may vary among the different sources.

SSI-IT SEDS

International Terminal Sediment Data Report

Figures

Final



Floyd Snider McCarthy, Inc.

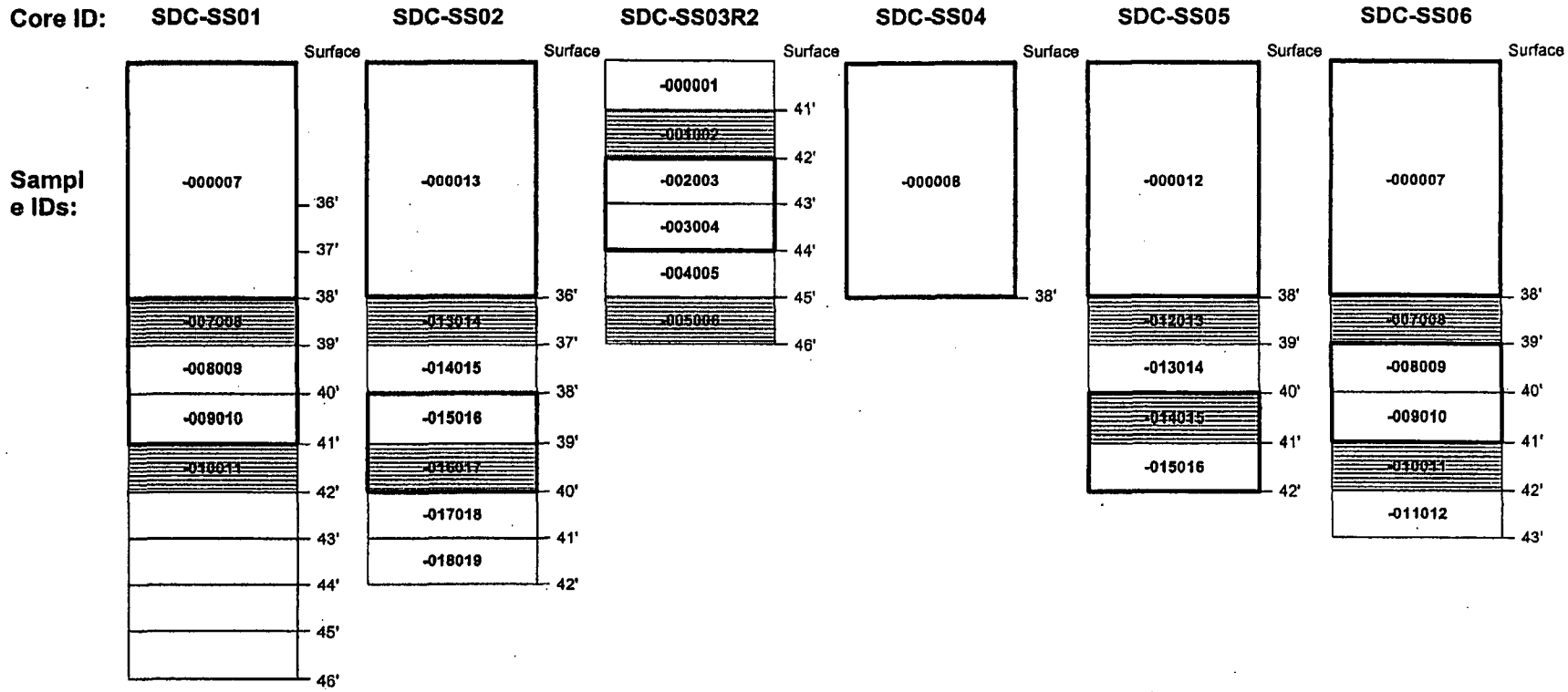
Data Report

Figure 2.1
Sediment Sampling Locations

DATE: 8/3/2003 10:18:22
MXD NAME: \\Server02\Data\projects\MCB-Bos\615\Data Report - Figure 2.1.mxd

SCHN00158118

Figure 2.2. PAH Screening and Compositing Scheme



Top and bottom composites (boxes with thick lines) show samples submitted for full analysis. Shaded intervals show samples submitted for PAH-screening. Top composites were analyzed immediately after sampling. The bottom composites were created based on PAH screening results as shown. Depth is indicated relative to Columbia River Datum (CRD).

SSI-IT SEDS

International Terminal Sediment Data Report

Appendix A
Bore Logs

Final

Project: International Terminals (IT) Slip

Station: SS-01

Maximum depth of retained sediment: 12.0 ft

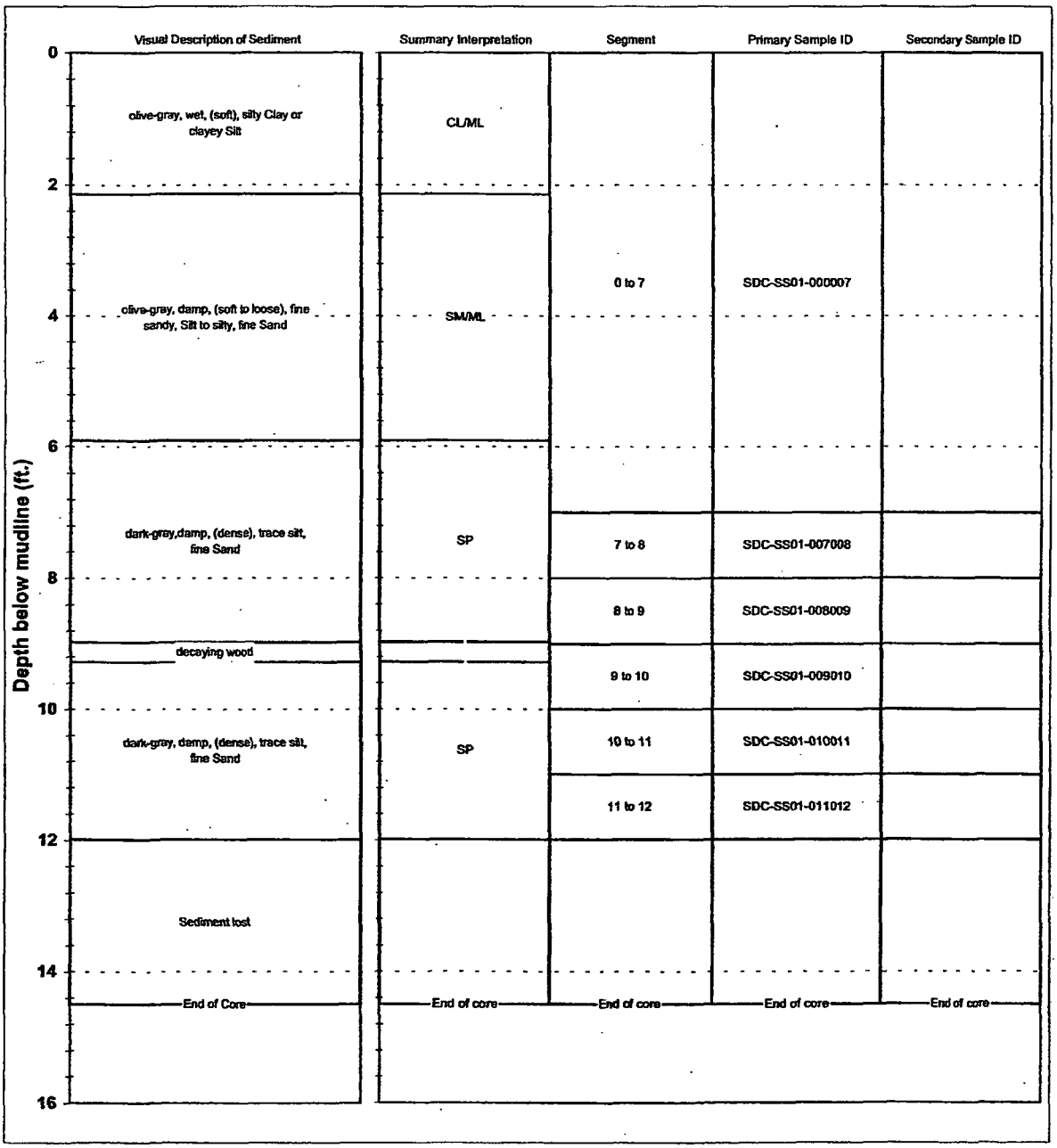
Mudline elevation: -31.1 ft CRD

Percent recovery (on-deck): 70%

	Core collection	Laboratory processing
Date:	3/12/03	3/12/03
Time:	13:40	15:16

Field Log: Tom Cammarata

Summary Log: Rob Gilmour



SCHN00158121

Project: International Terminals (IT) Slip

Station: SS-02

Maximum depth of retained sediment: 20.8 ft

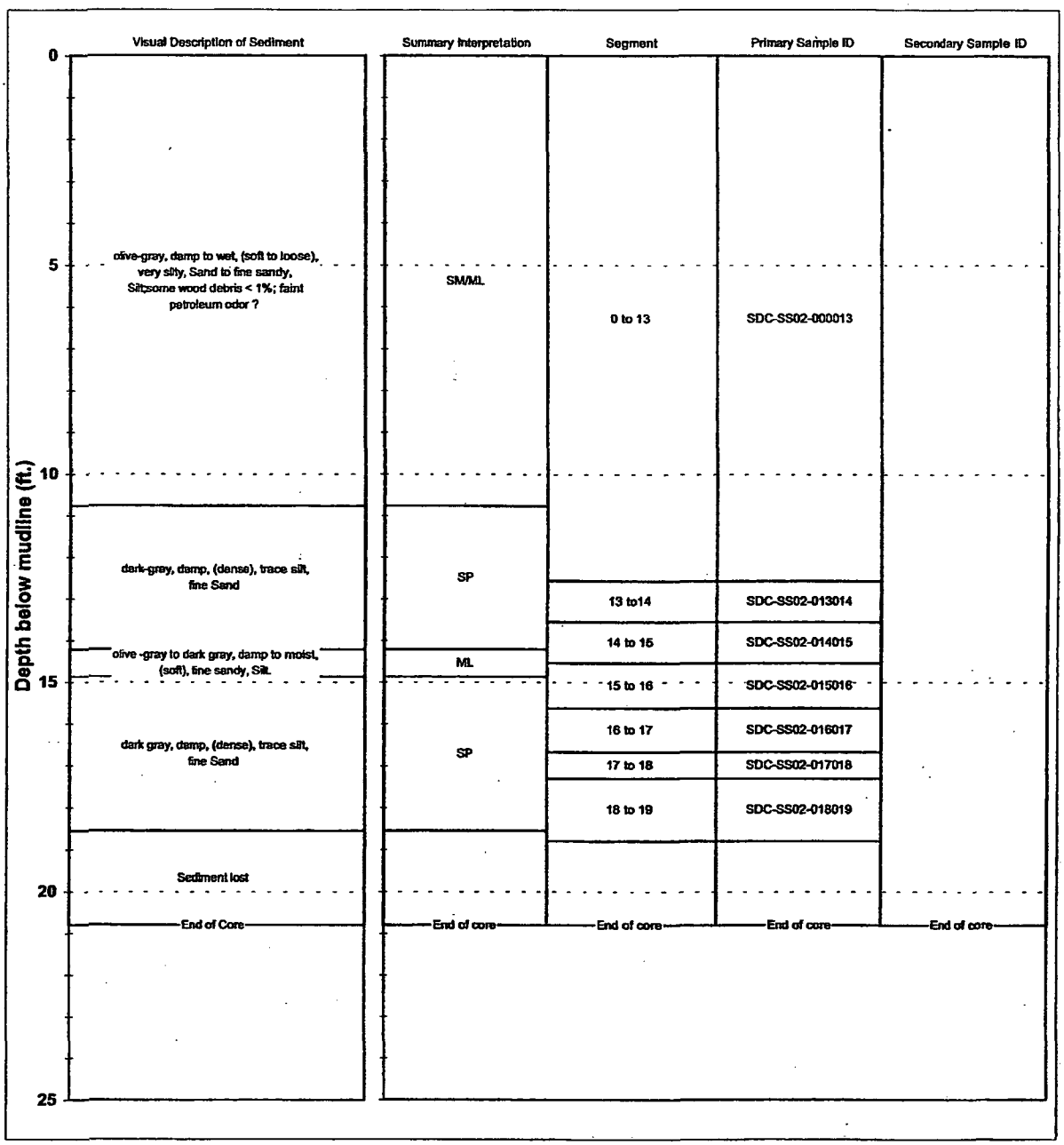
Mudline elevation: -23.4 ft CRD

Percent recovery (on-deck): 65%

	Core collection	Laboratory processing
Date:	3/12/03	3/12/03
Time:	14:54	16:45

Field Log: Tom Cammarata

Summary Log: Rob Gilmour



Project: International Terminals (IT) Slip

Station: SS-03R2

Maximum depth of retained sediment: 7.0 ft

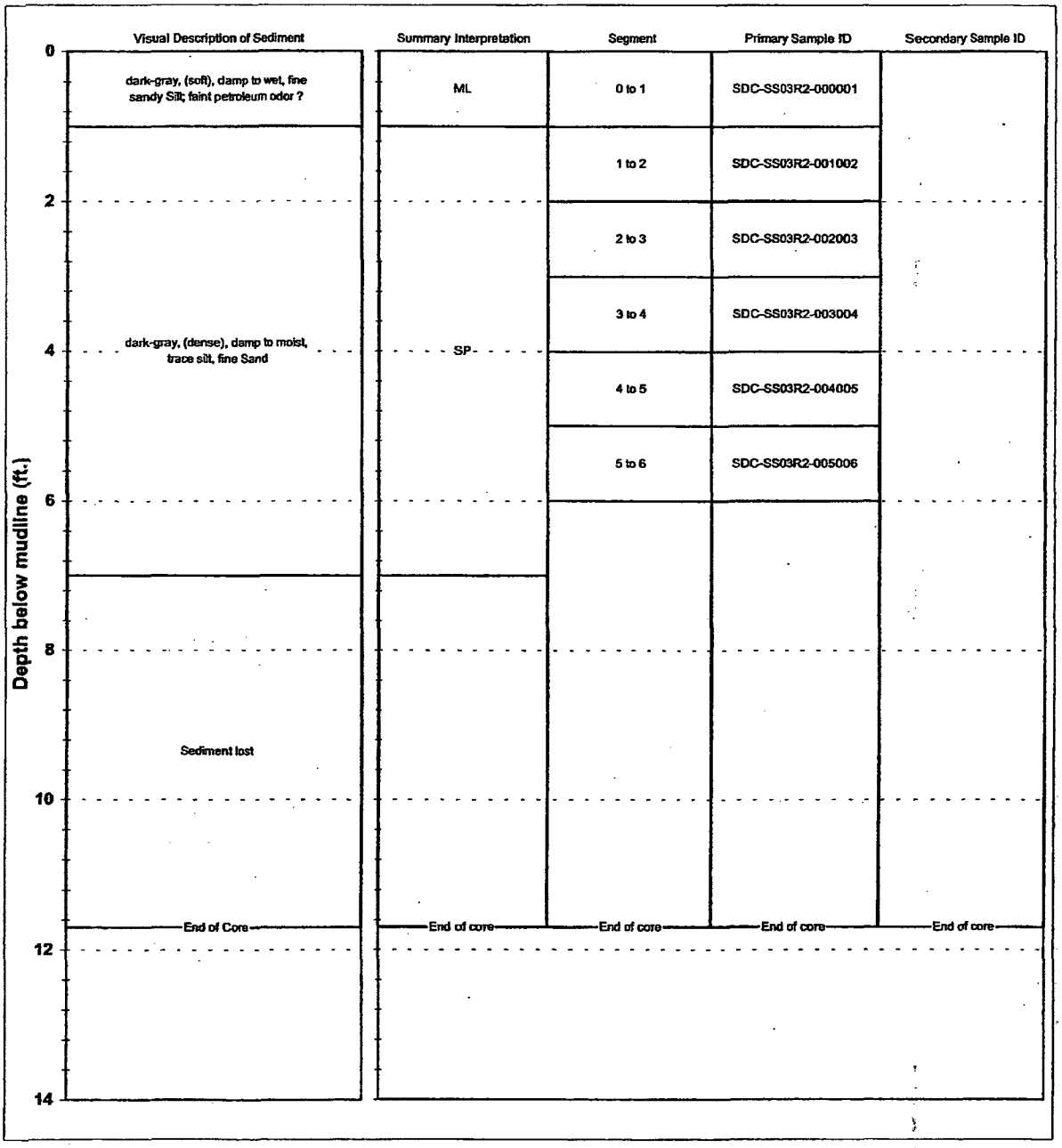
Mudline elevation: -40.4 ft CRD

Percent recovery (on-deck): 54%

	Core collection	Laboratory processing
Date:	3/12/03	3/12/03
Time:	10:37	12:45

Field Log: Tom Cammarata

Summary Log: Rob Gilmour



Project: International Terminals (IT) Slip

Station: SS-04

Maximum depth of retained sediment: 8.0 ft

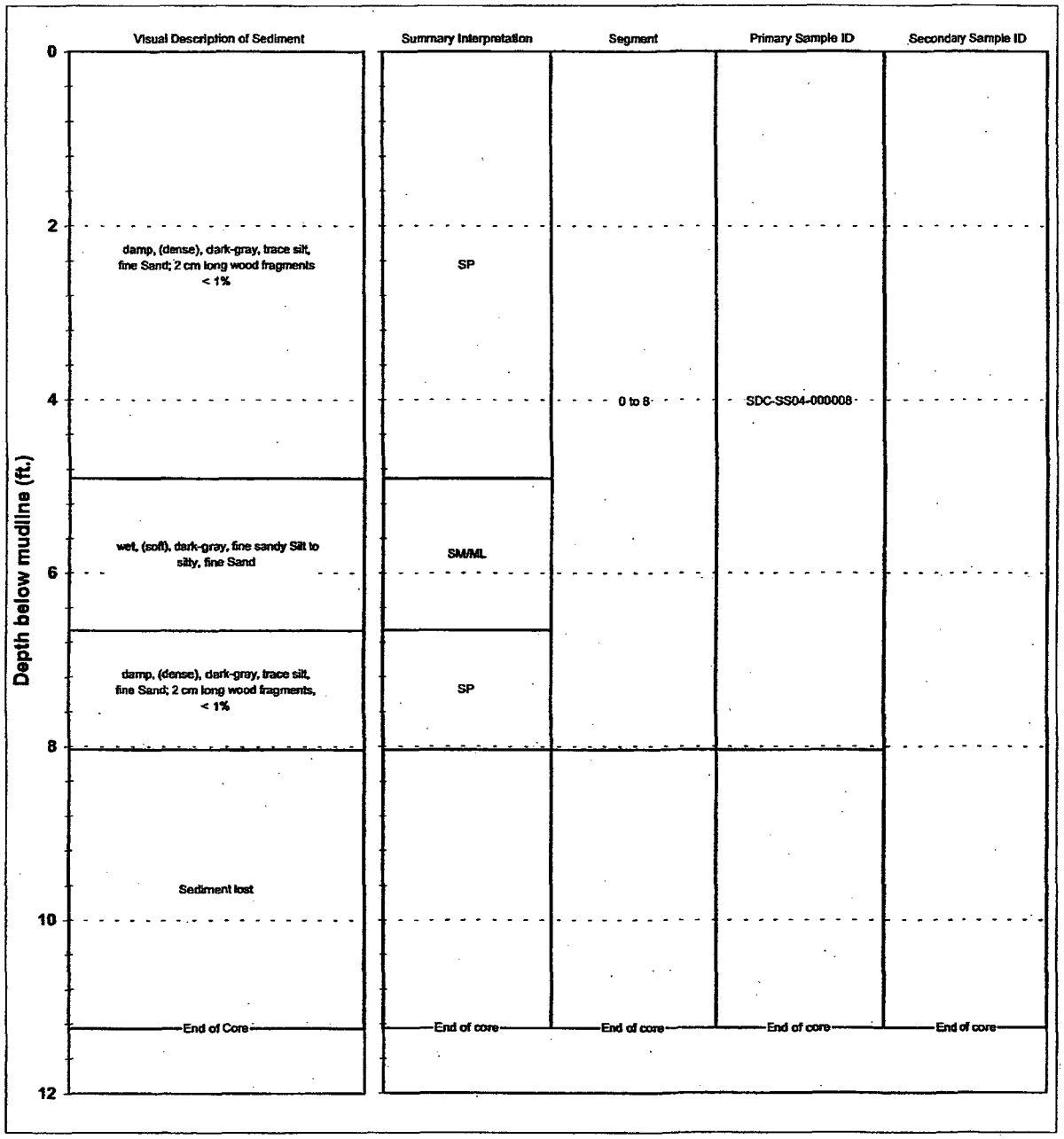
Mudline elevation: -29.5 **ft CRD**

Percent recovery (on-deck): 55%

	Core collection	Laboratory processing
Date:	3/11/03	3/11/03
Time:	12:37	14:21

Field Log: Tom Cammarata

Summary Log: Rob Gilmour



SCHN00158124

Project: International Terminals (IT) Slip

Station: SS-05

Maximum depth of retained sediment: 16.9 ft

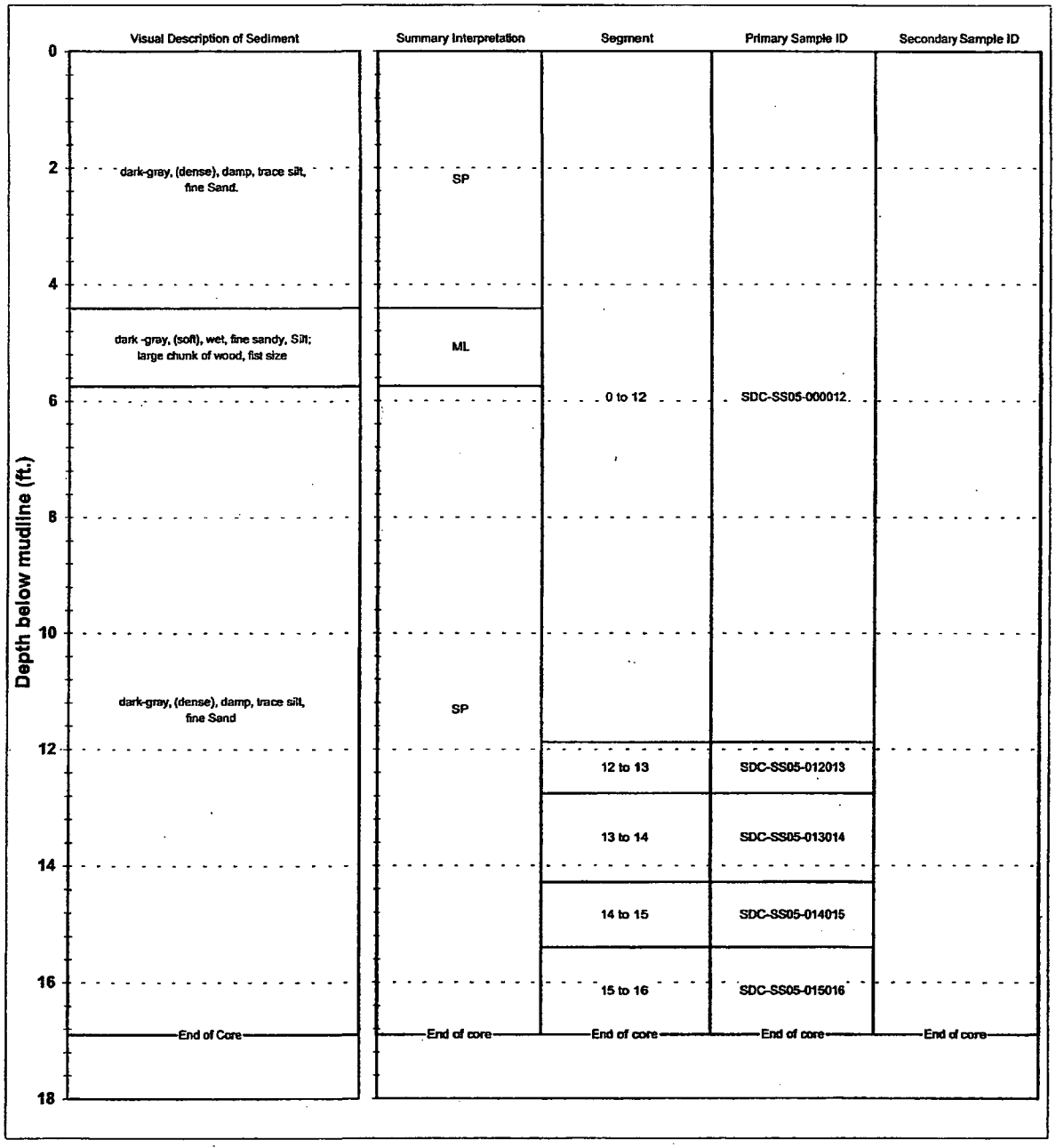
Mudline elevation: -26.5 ft CRD

Percent recovery (on-deck): 65%

	Core collection	Laboratory processing
Date:	3/11/03	3/11/03
Time:	14:33	17:00

Field Log: Tom Cammarata

Summary Log: Rob Gilmour



SCHN00158125

Project: International Terminals (IT) Slip

Station: SS-06

Maximum depth of retained sediment: 12.7 ft

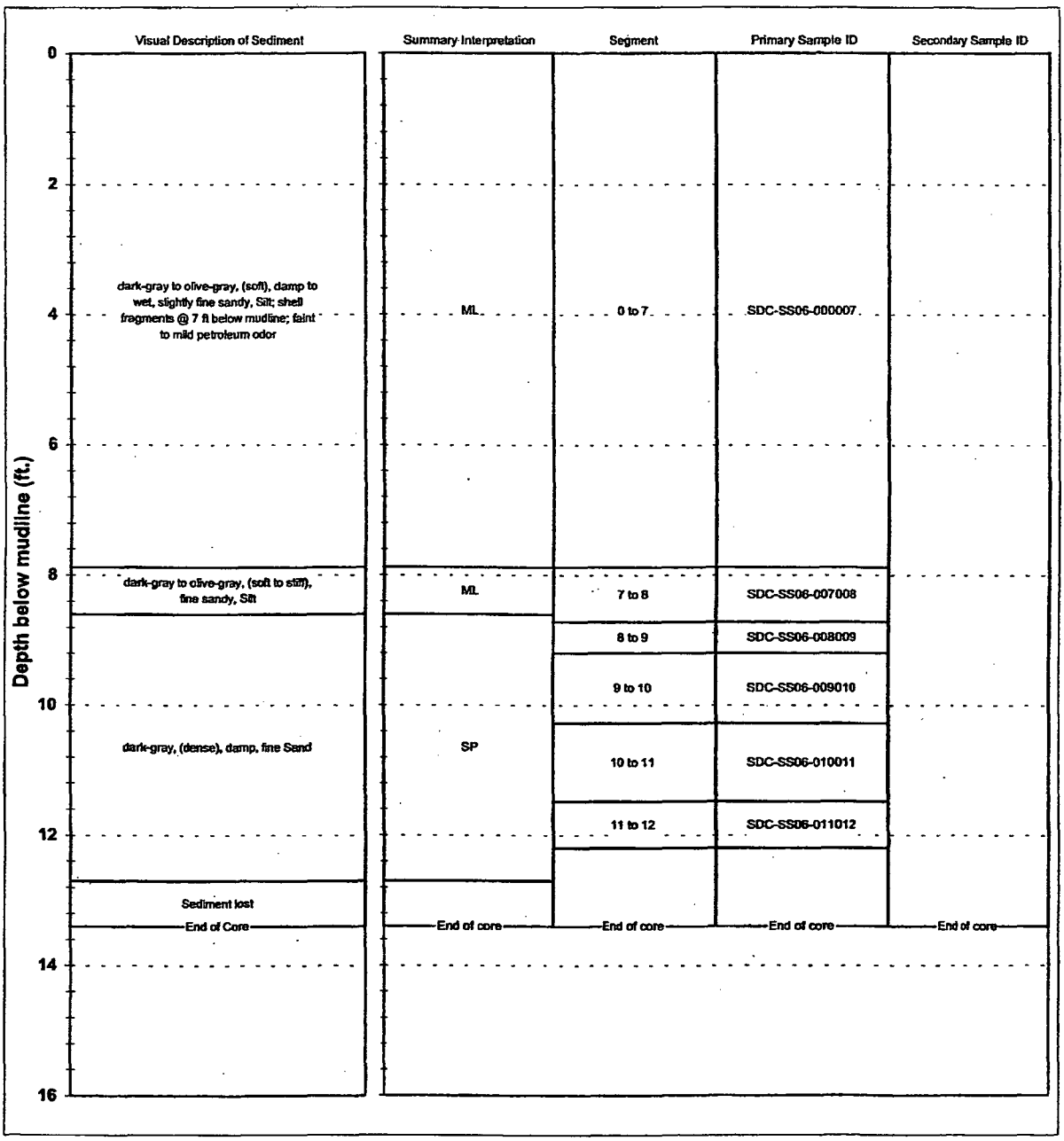
Mudline elevation: -30.6 ft CRD

Percent recovery (on-deck): 82%

	Core collection	Laboratory processing
Date:	3/13/03	3/13/03
Time:	13:29	15:05

Field Log: Tom Cammarata

Summary Log: Rob Gilmour



SCHN00158126

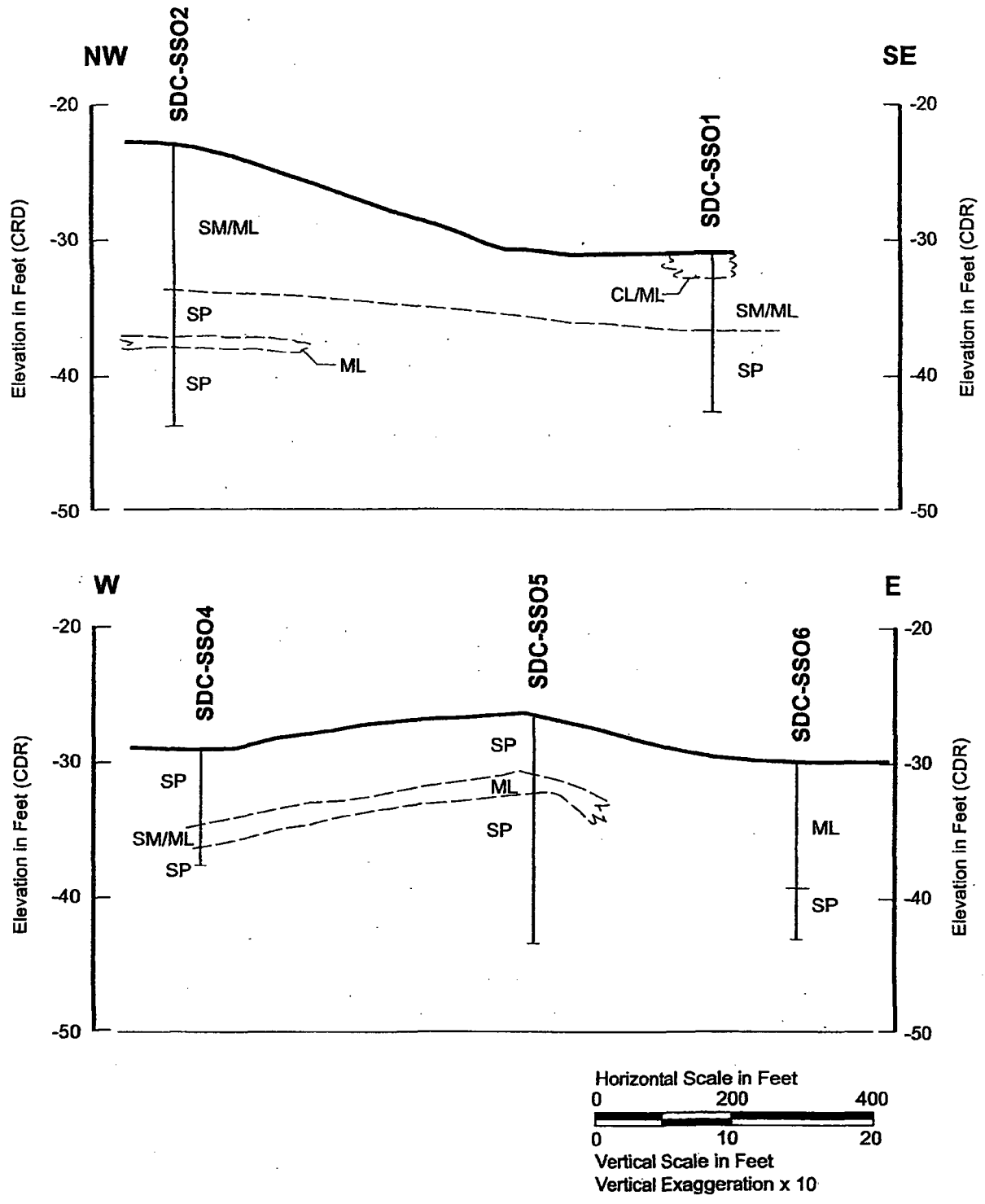
SSI-IT SEDS

International Terminal Sediment Data Report

Appendix B Cross-Sections

Final

SCHN00158127



corel/floydandsnider/IT-SLIP/Section1

Floyd Snider McCarthy, Inc.
Strategy and Technical Solutions for Contaminated Properties

International Terminal Slip
Portland, Oregon

Figure 1

SCHN00158128

SSI-IT SEDS

International Terminal Sediment Data Report

Appendix C
Chain of Custody Forms

Final

Columbia Analytical Services, Inc.
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CHAIN OF CUSTODY

Sediment and Tissue Chemistry

1317 South 13th Ave. • Kelso, WA 98626 • (360) 577-7222 • FAX (360) 636-1068

SR#: _____

PAGE 2 OF 3 COC # _____

PROJECT NAME: IT-SCIP

PROJECT NUMBER: SSI-ITSEDS.T5

PROJECT MANAGER: Allison Eisenbrecht

COMPANY/ADDRESS: Floyd Snider McCarthy
925 Fourth Ave. Seattle, WA 98104

PHONE #: 206-292-2078 FAX #: 206-682-7867

SAMPLER'S SIGNATURE: _____

SAMPLE I.D.	DATE	TIME	LAB I.D.	MATRIX	NUMBER OF CONTAINERS	Total Volatile Solids / Total Solids	TOC / (ASTM D4129M) / PSEP	Grain size / PSEP / ASTM D422	Sulfide / Total (9030M)	PSEP / Water Soluble	AVS / SEM (metals list below)	Ammonia / Total (350.1m)	PSEP / Plumb / Pore water	Metals (list below)	Pesticides (8081-L)	PCBs (8082-L) / Aroclors	Congeners	Semivolatiles / GC/MS SIM (PAH) / 8270-L	Organotins / Bulk / Pore Water / TBT only	Volatiles (8260)	Dioxins / 1613 / 8290	TPH / GRO / DRO / RRO	Lipids	Tissue Sample Preparations (instructions below)	Archive (160z)	Archive (60z)	PAH - screening	REMARKS
SDC-SSDR2-[illegible]	[illegible]	12:45			4																				3	X		
[illegible]	[illegible]	12:45			4																							
[illegible]	[illegible]	12:45			4																				3	X		
[illegible]	[illegible]	12:45			4																				3	X		
[illegible]	[illegible]	12:45			3																				2	X		
[illegible]	[illegible]	12:45			3																							
SDC-SS01-000004	9/12/03	15:16			6	✓	✓	✓						✓		✓		✓	✓						2				
SDC-SS01-000009	9/12/03	15:16																							1	X	X		
SDC-SS01-000009	9/12/03	15:16																							1	X			
SDC-SS01-000010	9/12/03	15:16																							1	X			

REPORT REQUIREMENTS

___ I. Routine Report: Method Blank, Surrogate, as required

___ II. Report Dup., MS, MSD as required

___ III. Data Validation Report (includes all raw data)

___ IV. CLP Deliverable Report

___ V. EDD

INVOICE INFORMATION

P.O. # _____

Bill To: _____

TURNAROUND REQUIREMENTS

___ 24 hr. ___ 48 hr.

___ 5 Day

___ Standard (10-15 working days)

___ Provide FAX Results

_____ Requested Report Date

Circle which metals are to be analyzed:

SMS Metals: As Cd Cr Cu Pb Hg Ag Zn
CA Metals: Ag As Cd Cr Cu Hg Ni Pb Se Zn Sb
SEM Metals: Cd Cu Pb Hg Ni Zn

SPECIAL INSTRUCTIONS/COMMENTS:

PAH Screening = 5 day turnaround

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature / Date/Time	Signature / Date/Time	Signature / Date/Time	Signature / Date/Time
Printed Name / Firm	Printed Name / Firm	Printed Name / Firm	Printed Name / Firm

SCHN00158130

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Sediment and Tissue Chemistry

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SR#: _____

PAGE 2 OF 3 COC # _____

PROJECT NAME

PROJECT NUMBER

PROJECT MANAGER

COMPANY/ADDRESS

PHONE # FAX #

SAMPLER'S SIGNATURE

SAMPLE I.D.	DATE	TIME	LAB I.D.	MATRIX	NUMBER OF CONTAINERS	☐ Total Volatile Solids ☑ Total Solids	TOC ☐ (ASTM D4129M) ☑ PSEP Grain size ☑ PSEP ☐ ASTM D422	Sulfide ☐ Total (9030M) ☐ AVS	☐ PSEP ☐ Water Soluble ☐ SEM (metals list below)	Ammonia ☐ Total (350.1m)	☐ Plumb ☐ Pore water Metals (list below)	Pesticides (8081-L)	PCBs (8082-L) ☑ Aroclors ☐ Congeners	Semivolatiles ☐ GC/MS SIM (PAH) ☐ 8270-L	Organotins ☐ Bulk ☐ Pore Water	Volatiles (8260) ☑ TBT only	Dioxins ☐ 1613 ☐ 8290	TPH ☐ GRO ☐ DRO ☐ RRO	Lipids	Tissue Sample Preparations (instructions below)	[illegible]	[illegible]	REMARKS
[illegible]	3/12/03	15[illegible]		SED	3															1			
[illegible]	3/12/03	[illegible]		SED	3															1	2		
[illegible]	3/12/03	15[illegible]		SED	2															1	2		
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SDC-SS02-003014	3/12/03	1645		SED	3															1		✓	
SDC-SS02-014015	3/12/03	1645		SED	3															1	2		
SDC-SS02-015016	3/12/03	1645		SED	4															1	2		
SDC-SS02-016017	3/12/03	1645		SED	3															1		✓	
SDC-SS02-017018	3/12/03	1645		SED	3															1	2		
SDC-SS02-018019	3/12/03	1645		SED	3															1	2		

REPORT REQUIREMENTS

___ I. Routine Report: Method Blank, Surrogate, as required

___ II. Report Dup., MS, MSD as required

___ III. Data Validation Report (Includes all raw data)

___ IV. CLP Deliverable Report

___ V. EDD

INVOICE INFORMATION

P.O. # _____

Bill To: _____

TURNAROUND REQUIREMENTS

____ 24 hr. ____ 48 hr.

____ 5 Day

____ ✓ Standard (10-15 working days)

____ Provide FAX Results

_____ Requested Report Date

Circle which metals are to be analyzed:

SMS Metals: As Cd Cr Cu Pb Hg Ag Zn

CA Metals: Ag As Cd Cr Cu Hg Ni Pb Se Zn

SEM Metals: Cd Cu Pb Hg Ni Zn

SPECIAL INSTRUCTIONS/COMMENTS:

PAH Screening 5-day turnaround

RELINQUISHED BY:		RECEIVED BY:		RELINQUISHED BY:		RECEIVED BY:	
Signature	Date/Time	Signature	Date/Time	Signature	Date/Time	Signature	Date/Time
Printed Name	Firm	Printed Name	Firm	Printed Name	Firm	Printed Name	Firm

SCHN00158131

Columbia Analytical Services INC.
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Sediment and Tissue Chemistry

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SR#: _____

 COC #: _____

PROJECT NAME: IT-SLIP

PROJECT NUMBER: Allison Geiselbrecht

PROJECT MANAGER: SS-ITSED-TS

COMPANY/ADDRESS: ESM
801 South King St. Seattle, WA 98104

PHONE #: 206-382-2078   FAX #: 206-682-7827

SAMPLER'S SIGNATURE: [signature]

SAMPLE I.D.	DATE	TIME	LAB I.D.	MATRIX	NUMBER OF CONTAINERS	☐ Total Volatile Solids ☐ Total Solids	TOC ☐ (ASTM D4129M) ☐ PSEP	Grain size ☐ PSEP ☐ ASTM D422	Sulfide ☐ Total (9030M) ☐ PSEP ☐ Water Soluble	☐ AVS ☐ SEM (metals list below)	Ammonia ☐ Total (350.1m) ☐ Plumb ☐ Pore water	Metals (list below)	Pesticides (8081-L)	PCBs (8082-L) ☐ Aroclors ☐ Congeners	Semivolatiles ☐ GC/MS SIM (PAH) ☐ 8270-L	Organotins ☐ Bulk ☐ Pore Water ☐ TBT only	Volitiles (8260)	Dioxins ☐ 1613 ☐ 8290	TPH ☐ GRO ☐ DRO ☐ RRO	☐ Lipids	Tissue Sample Preparations (Instructions below)	[illegible]			REMARKS
SDC-5508-004005	3/13	1713		SED	2																	2			
SDC-5508-005006	3/13	1713		SED	2																	2			
SDC-5508-006007	3/13	1713		SED	2																	2			
[illegible]	3/13	1713		SED	2																	2			
[illegible]	3/13	1713		SED	2																	2			
[illegible]	3/13	1713		SED	1																	1			

REPORT REQUIREMENTS

___ I. Routine Report: Method Blank, Surrogate, as required

___ II. Report Dup., MS, MSD as required

___ III. Data Validation Report (includes all raw data)

___ IV. CLP Deliverable Report

___ V. EDD

INVOICE INFORMATION

P.O. # _____

Bill To: _____

TURNAROUND REQUIREMENTS

___ 24 hr. ___ 48 hr.

___ 5 Day

___ Standard (10-15 working days)

___ Provide FAX Results

_____ Requested Report Date

Circle which metals are to be analyzed:

SMS Metals:	As	Cd	Cr	Cu	Pb	Hg	Ag	Zn	
CA Metals:	Ag	As	Cd	Cr	Cu	Hg	Ni	Pb	Se	Zn
SEM Metals:	Cd	Cu	Pb	Hg	Ni	Zn			

SPECIAL INSTRUCTIONS/COMMENTS:

RELINQUISHED BY:		RECEIVED BY:		RELINQUISHED BY:		RECEIVED BY:	
[signature]	3/14/03 0830hrs	[signature]	3/14/03 1015				
Signature	Date/Time	Signature	Date/Time	Signature	Date/Time	Signature	Date/Time
[illegible]	[illegible]	[illegible]	CAS				
Printed Name	Firm	Printed Name	Firm	Printed Name	Firm	Printed Name	Firm

SCHN00158132

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Sediment and Tissue Chemistry

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SR#: _____

PAGE 1 OF _____ COC # _____

PROJECT NAME: IT-SLIP

PROJECT NUMBER: SS-ITSED-TS

PROJECT MANAGER: Allison Geiselbrecht

COMPANY/ADDRESS: FSM

93 South King St. Seattle, WA 98104

PHONE # 206-292-2078 FAX # 206-682-7827

SAMPLER'S SIGNATURE: [signature]

SAMPLE I.D.	DATE	TIME	LAB I.D.	MATRIX	NUMBER OF CONTAINERS	Total Volatile Solids	Total Solids	Grain size	PSEP	ASTM D422	Sulfide	Total (9030M)	AVS	PSEP	Water Soluble	SEM (metals list below)	Ammonia	Total (350.1m)	Plumb	Pore water	Metals (list below)	Pesticides (8081-L)	PCBs (8082-L)	Aroclors	Congeners	Semivolatiles	GC/MS SIM (PAH)	8270-L	Organotins	Bulk	Pore Water	TBT only	Volatiles (8260)	Dioxins	1613	8290	TPH	GRO	DRO	RRO	Lipids	Tissue Sample Preparations (Instructions below)	Archive 1607	Archive 802	PAH - Screen	REMARKS
SDC-SSO6-000007	3/13	1505		SED	6	✓	✓	✓												✓		✓		✓	✓																2				
SDC-SSO6-000009	3/13	1505		SED	3																																				1			✓	
SDC-SSO6-000009	3/13	1505		SED	3																																				1	2			
SDC-SSO6-000010	3/13	1505		SED	3																																				1	2			
SDC-SSO6-000011	3/13	1505		SED	3																																				1	(X2)		✓	
SDC-SSO6-000012	3/13	1505		SED	3																																					1				
SDC-SSO8-000001	3/13	1713		SED	2																																				2				
SDC-SSO8-000002	3/13	1718		SED	2																																				2				
SDC-SSO8-000003	3/13	1713		SED	2																																				2				
SDC-SSO8-000004	3/13	1713		SED	2																																				2				

REPORT REQUIREMENTS

___ I. Routine Report: Method Blank, Surrogate, as required

___ II. Report Dup., MS, MSD as required

___ III. Data Validation Report (Includes all raw data)

___ IV. CLP Deliverable Report

___ V. EDD

INVOICE INFORMATION

P.O. # _____

Bill To: _____

TURNAROUND REQUIREMENTS

___ 24 hr. ___ 48 hr.

___ 5 Day

✓ Standard (10-15 working days)

___ Provide FAX Results

_____ Requested Report Date

Circle which metals are to be analyzed:

SMS Metals: As Cd Cr Cu Pb Hg Ag Zn

CA Metals: Ag As Cd Cr Cu Hg Ni Pb Se (Zn) (Sb)

SEM Metals: Cd Cu Pb Hg Ni Zn

SPECIAL INSTRUCTIONS/COMMENTS:

PAH SCREEN: 5 day turnaround.

(X) = FINAL

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature: [signature]	Signature: [signature]	Signature:	Signature:
Date/Time: 3/14/03 0830 hrs	Date/Time: 3/14/03 1000	Date/Time:	Date/Time:
Printed Name: [illegible]	Printed Name: [illegible]	Printed Name:	Printed Name:
Firm: FSM	Firm: CAS	Firm:	Firm:

SCHN00158133

Columbia Analytical Services INC.
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CHAIN OF CUSTODY
Sediment and Tissue Chemistry

1317 South 13th Ave. • Kelso, WA 98626 • (360) 577-7222 • FAX (360) 636-1068

PAGE 1 OF 3 SR#: _____ COC #: _____

PROJECT NAME: IT-SLIP
PROJECT NUMBER: SSI.ITSED.TS
PROJECT MANAGER: Allison Geiselbrecht
COMPANY/ADDRESS: Floyd Snider McCarthy
811 1st Ave, Seattle WA 98104
PHONE #: 206-292-2078 FAX #: 206-682-7867
SAMPLER'S SIGNATURE: [signature]

SAMPLE I.D.	DATE	TIME	LAB I.D.	MATRIX	NUMBER OF CONTAINERS	Total Volatile Solids ☐ Total Solids	TOC ☐ (ASTM D4129M) ☑ PSEP	Grain size ☑ PSEP ☐ ASTM D422	Sulfide ☐ Total (9030M) ☐ PSEP ☐ Water Soluble	☐ AVS ☐ SEM (metals list below)	Ammonia ☐ Total (350.1m) ☐ Plumb ☐ Pore water	Metals (list below)	Pesticides (8081-L)	PCBs (8082-L) ☐ Arochlors ☐ Congeners	Semivolatiles ☐ GC/MS SIM (PAH) ☐ 8270-L	Organotins ☐ Bulk ☐ Pore Water ☐ TBT only	Volatiles (8260)	Dioxins ☐ 1613 ☐ 8290	TPH ☐ GRO ☐ DRO ☐ RRO	PAH screening GC/MS SIM	Tissue Sample Preparations (Instructions below)	Archive (1602)	TBT	Archive (602)	REMARKS
SDC-0504-[illegible]	3/11	1433		SED	6	✓	✓	✓	[illegible]			✓	✓	✓	✓						2		✓		
SDC-0505-[illegible]	3/11	1700		SED	6	✓	✓	✓	[illegible]			✓	✓	✓	✓					X					
SDC-0505	3/11	1700		SED	3															✓		2	✓		
SDC-0505-013014	3/11	1700		SED	3																	1		2	
SDC-0505-014015	3/11	1700		SED	2																			2	
SDC-0505-015016	3/11	1700		SED	2															✓					

REPORT REQUIREMENTS

___ I. Routine Report: Method Blank, Surrogate, as required
___ II. Report Dup., MS, MSD as required
___ III. Data Validation Report (includes all raw data)
___ IV. CLP Deliverable Report
___ V. EDD

INVOICE INFORMATION

P.O. # _____
Bill To: _____

TURNAROUND REQUIREMENTS

___ 24 hr. ___ 48 hr.
___ 5 Day
✓ Standard (10-15 working days)
___ Provide FAX Results
_____ Requested Report Date

Circle which metals are to be analyzed:

SMS Metals: As Cd Cr Cu Pb Hg Ag Zn
CA Metals: (Ag) As Cd Cr (Cu) Hg (Ni) (Pb) Se (Zn)
SEM Metals: Cd Cu Pb Hg Ni Zn

SPECIAL INSTRUCTIONS/COMMENTS:

(X) = Freeze
PAH Screening = 5-day turnaround.

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature: [signature]	Signature: [signature]	Signature:	Signature:
Date/Time: 3/12/04	Date/Time: [illegible]	Date/Time:	Date/Time:
Printed Name: [illegible]			
Firm: [illegible]			

SCHN00158134

SSI-IT SEDS

International Terminal Sediment Data Report

Appendix D Data Validation Report

Final

SSI-IT SEDS

DATA VALIDATION REPORT
INTERNATIONAL TERMINALS
SEDIMENT DATA COLLECTION

Prepared for

SCHNITZER STEEL INDUSTRIES, INC

Prepared by

Floyd Snider McCarthy, Inc.
83 South King Street
Suite 614
Seattle, Washington 98104

June 26, 2003

Final

Table of Contents

List of Tables

1.0 INTRODUCTION

Samples were collected between March 11 and 13, 2003 for the International Terminal (IT) Slip Site. Chemical and physical sediment analyses were performed by Columbia Analytical Services, Inc. (CAS) in Kelso, Washington. Conventional parameters such as grain size, total solids and total organic carbon (TOC) were analyzed according to Puget Sound Estuary Program (PSEP) guidelines (PSEP, 1996). Metals were analyzed with USEPA method 200.8, mercury was analyzed with USEPA method 7471, and organometallic compounds were analyzed according to the Krone method (Krone et al. 1989). Organics including PAHs, chlorinated hydrocarbons, phthalates, phenols, and miscellaneous extractables were analyzed with USEPA method 8270C. Pesticides were analyzed with USEPA method 8081, and PCBs with USEPA method 8082 (USEPA, 1986).

A summary data evaluation was performed on the analytical results. Evaluation was performed by Jaana Pietari of Floyd Snider McCarthy, Inc. Quality control objectives in the CAS laboratory Standard Operating Procedures were used as data quality objectives. Data qualifiers are assigned based only on the criteria reviewed, and do not include calibration or instrument performance issues. Results of the data evaluation are presented in sections 2.0 to 10.0, qualified data are summarized in section 11.0, and qualifiers are defined in Section 12.0.

Data validation was performed on the following data:

Sample ID	Lab Code	Sample Date
SDC-SS01-000007	K2301912-013	3/12/2003
SDC-SS02-000013	K2301912-020	3/12/2003
SDC-SS04-000008	K2301912-001	3/11/2003
SCD-SS05-0000012	K2301912-002	3/11/2003
SDC-SS06-000007	K2301951-001	3/13/2003
SDC-SS01-007010C[1]	K2302533-010	3/12/2003
SDC-SS02-015017C[1]	K2302533-013	3/12/2003
SDC-SS03-002004C[1]	K2302533-006	3/12/2003
SDC-SS05-014016C[1]	K2302533-003	3/11/2003
SDC-SS06-008010C[1]	K2302533-016	3/13/2003
SDC-SS01-007008	K2301912-014	3/12/2003
SDC-SS01-010011	K2301912-017	3/12/2003
SDC-SS02-013014	K2301912-021	3/12/2003
SDC-SS02-016017	K2301912-024	3/12/2003
SDC-SS03R2-001002	K2301912-008	3/12/2003
SDC-SS03R2-005006	K2301912-012	3/12/2003

Sample ID	Lab Code	Sample Date
SDC-SS05-012013	K2301912-003	3/11/2003
SDC-SS05-015016	K2301912-006	3/11/2003
SDC-SS06-007008	K2301950-001	3/13/2003
SDC-SS06-010011	K2301950-002	3/13/2003
[1] These samples were composited in the analytical laboratory.		

The table below presents abbreviations and definitions used in this report.

Abbreviation	Definition
DV	Data Validation
LCS	Laboratory Control Sample
MS	Matrix Spike
MSD	Matrix Spike Duplicate
RPD	Relative Percent Difference

2.0 CHAIN OF CUSTODY FORMS-*ACCEPTABLE*

The Chain of Custody (COC) forms were completely and correctly filed and all required signatures were present. Sample names have been correctly transcribed from the COC forms. All analyses have been performed as requested. The pesticide analysis for samples SDC-SS01-000007, SDC-SS02-000013 and SDC-SS06-000007 was not checked in the COC forms although the SAP specified that the analysis was to be performed. The laboratory had performed the analysis for SDC-SS01-000007 and SDC-SS02-000013. Following a written request to CAS, the pesticide analysis for SDC-SS06-000007 was conducted.

3.0 GRAIN SIZE ANALYSES

3.1 Laboratory Quality Control Analysis Frequencies-*Acceptable*

The PSEP guidelines recommend one triplicate grain size analysis for every 20 samples or per batch, whichever is more frequent. Grain size analyses were performed in triplicate in each analysis batch.

3.2 Extraction and Analysis Holding Times-*Acceptable*

The extraction and holding time analyses for samples SDC-SS01-000007, SDC-SS02-000013, SDC-SS04-000008, SDC-SS05-0000012 and SDC-SS06-000007 were met. Grain size analyses for SDC-SS01-007010C, SDC-SS02-015017C, SDC-SS03R2-002004C, SDC-SS05-

014016C and SDC-SS06-008010C were performed from frozen samples. PSEP guidelines recommend that that samples for this analysis should not be frozen, since freezing and thawing may alter the particle size distribution. However, the sample material was composed of river sand, which is not likely to be affected by freeze and thaw processes. Therefore, using the best professional judgment, these results were not qualified.

3.3 Electronic Data Deliverable (EDD)-*Acceptable*

Approximately 10 percent of the sample results were compared to the laboratory report. No discrepancies were noted.

3.4 Overall Assessment

Laboratory triplicate variability was minimal, and should be considered in control.

4.0 TOTAL SOLIDS ANALYSES

4.1 Laboratory Quality Control Analysis Frequencies-*Acceptable*

The PSEP guidelines recommend one triplicate total solids analysis for 20 samples or per batch. One duplicate analysis was performed per batch. Since the relative percent differences (RPD) were less than one percent for the duplicate results (see section 4.3), the results are considered valid and are not qualified.

4.2 Extraction and Analysis Holding Times-*Acceptable*

Refrigerated samples must be analyzed within 14 days of collection and frozen samples must be analyzed within six months of collection (USACE 1998). All holding time requirements were met.

4.3 Laboratory Duplicate Relative Percent Differences-*Acceptable*

The laboratory has specified that RPDs for duplicate or triplicate results must be less than 40 percent. The RPDs for duplicate analyses was less than one percent.

4.4 Electronic Data Deliverable-*Acceptable*

Total solids results were not reported in the EDD.

4.5 Overall Assessment

Total solids analysis was performed in duplicate instead of the recommended triplicate. However, the variability between the duplicate results was minimal, which indicates that the analysis was in control.

5.0 TOC ANALYSES

5.1 Laboratory Quality Control Analysis Frequencies-*Acceptable*

Each analytical batch included a method blank, a matrix spike (MS), and a laboratory control sample (LCS). No matrix spike duplicate (MSD) was run.

5.2 Extraction and Analysis Holding Times-*Acceptable*

Refrigerated samples must be analyzed within 14 days of collection and frozen samples must be analyzed within six months of collection (USACE 1998). All holding time requirements were met.

5.3 Reporting Limits-*Acceptable*

The reporting limits specified in the SAP were met.

5.4 Laboratory Blank Results-*Acceptable*

No target analytes were detected in the method blanks.

5.5 Laboratory Control Sample Recoveries (LCS)-*Acceptable*

The CAS-specified acceptable recoveries for TOC in laboratory control samples are between 85 and 115 percent. All LCS recoveries were within the limits.

5.6 Matrix Spike and Matrix Spike Duplicate Recoveries-*Acceptable*

The CAS-specified acceptable MS recoveries for TOC are between 75 and 125 percent. All MS recoveries were within the limits. No MSD samples were analyzed.

5.7 Laboratory Triplicate Relative Percent Differences-*Acceptable*

Laboratory has specified that RPDs for duplicate or triplicate results must be less than 40 percent. The RPD for triplicate TOC analyses were two percent or less than one percent.

5.8 Electronic Data Deliverable-*Acceptable*

Approximately 10 percent of the sample results were compared to the laboratory report. No discrepancies were noted.

5.9 Overall Assessment

All LCS and MS recoveries were within control limits, demonstrating that method accuracy was in control. The laboratory triplicate variability was minimal, which indicates the analysis method was in control.

6.0 METALS ANALYSES

6.1 Laboratory Quality Control Analysis Frequencies-*Acceptable*

The following quality control samples were analyzed with each batch: method blank, matrix spike, duplicate, and laboratory control sample.

6.2 Extraction and Analysis Holding Times-*Acceptable*

Refrigerated samples must be analyzed within six months of collection for metals analyzed by inductively coupled plasma (ICP) emission spectrometry and within 28 days of collection for mercury analysis. All holding times were met.

6.3 Reporting Limits-*Acceptable*

Reporting limits were slightly elevated to meet requirements specified in the SAP. Metals, except for mercury, were analyzed from samples that were diluted by a factor of five. The reporting limits in the SAP are for soil, and do not take into account the moisture content of the sediments, and therefore are acceptable.

6.4 Laboratory Blank Results-*Acceptable*

No target analytes were detected in the method blanks in concentrations greater than the method reporting limits (MRL).

6.5 Laboratory Control Sample Recoveries-*Acceptable*

All LCS recoveries were within the laboratory's control limits.

6.6 Matrix Spike Recoveries-*Acceptable*

All MS recoveries were within the laboratory's control limits except for antimony. The MS recoveries for antimony were 27 percent or 39 percent while laboratory's control limits for antimony are between 70 and 130 percent. Since the MS recoveries were low and no post-digestion spike was added to the samples, the associated sample results (antimony in SDC-SS01-000007, SDC-SS02-000013, SDC-SS04-000008, SDC-SS05-0000012, SDC-SS06-000007, SDC-SS01-007010C, SDC-SS02-015017C, SDC-SS03R2-002004C, SDC-SS05-014016C and SDC-SS06-008010C) were qualified as "J"

6.7 Laboratory Duplicate Relative Percent Differences-*Acceptable*

The laboratory has specified that RPDs for duplicate or triplicate results must be less than 40 percent. The RPDs for duplicate samples were less than 40 percent for all analytes except for antimony for samples SDC-SS01-000007, SDC-SS02-000013, SDC-SS04-000008, SDC-SS05-0000012 and SDC-SS06-000007. The RPD for antimony was 64 percent. The associated antimony results for the samples were previously qualified as "J" (Section 6.6), therefore, no additional qualifiers were assigned.

For samples SDC-SS01-007010C, SDC-SS02-015017C, SDC-SS03R2-002004C, SDC-SS05-014016C and SDC-SS06-008010C, the RDPs for antimony, silver, and mercury were 200 percent, 50 percent and 200 percent, respectively. Both results for mercury were less than the MRL. The results for silver were 0.03 and 0.02 mg/kg while the MRL was 0.02 mg/kg. The results for antimony were 0.06 and 0.05 mg/kg while the MRL was 0.05. Since the results were either less than or near the MRLs, they are not qualified.

6.8 Electronic Data Deliverable-*Acceptable*

Approximately 10 percent of the sample results were compared to the laboratory report. No discrepancies were noted.

6.9 Overall Assessment

All LCS and the majority of MS were within control limits, demonstrating in-control method accuracy. Duplicate variability was minimal, except for antimony. Therefore, the analysis method should be considered in control.

The metals data qualifiers are summarized in Section 12.0 of this report.

7.0 ORGANICS ANALYSES

7.1 Laboratory Quality Control Analysis Frequencies-*Acceptable*

The following quality control samples were analyzed with each batch: method blank, matrix spike, matrix spike duplicate, laboratory control sample and laboratory control sample duplicate.

7.2 Extraction and Analysis Holding Times-*Acceptable*

Refrigerated samples should be extracted within 14 days of collection and frozen samples within one year of collection. Extracted samples should be analyzed within 40 days of extraction. All holding time requirements were met.

7.3 Reporting Limits-*Acceptable*

Most samples met the reporting limit requirements specified in the SAP. The reporting limits were slightly elevated for SDS-SS01-000007 for all compounds and elevated by a factor of five

for bis(2-ethylhexyl)phthalate (1100 µg/kg versus 200 µg/kg specified in the SAP). Sample SDC-SS02-000013 was analyzed from a sample diluted by a factor of 10, and therefore, the reporting limits were elevated.

7.4 Laboratory Blank Results-*Acceptable*

No target analytes were recovered in the method blanks for samples SDC-SS01-000007, SDC-SS02-000013, SDC-SS04-000008, SDC-SS05-0000012 and SDC-SS06-000007. Di-n-butylphthalate was detected at concentrations greater than the MRL at 12 µg/kg in method blanks associated with samples SDC-SS01-007010C, SDC-SS02-015017C, SDC-SS03R2-002004C, and SDC-SS06-008010C. Since di-n-butylphthalate was not detected in these samples, the results were not qualified.

7.5 Surrogate Recoveries-*Acceptable*

Laboratory-specified surrogate recovery limits for 2-fluorophenol, phenol-d6, nitrobenzene-d5, 2-fluorobiphenyl, 2,4,6-tribromophenol, p-terphenyl-d14 are 38-110 percent, 43-128 percent, 30-139 percent, 37-126 percent, 38-157 percent and 54-158 percent, respectively. The surrogate recoveries for most samples were within the control limits. Recoveries for 2-fluorophenol, nitrobenzene-d5 and 2-fluorobiphenyl were 28 percent, 22 percent and 18 percent, respectively in sample SDC-SS03R2-002004. Recovery for 2-fluorobiphenyl in sample SDC-SS06-008010 was 30 percent. These samples were re-extracted and reanalyzed, but they produced similar results due to matrix interferences. The original results are reported. Since two surrogates within the base/neutral fraction were out of specification in SDC-SS03R2-002004, all compounds in the base/neutral fraction for this sample are qualified. The associated results for 1,3-dichlorobenzene, 1,4-dichlorobenzene, 1,2-dichlorobenzene, hexachloroethane, benzyl alcohol, 1,2,4-trichlorobenzene, naphthalene, hexachlorobutadiene, 2-methylnaphthalene, acenaphthylene, dimethylphthalate, acenaphthene, dibenzofuran, fluorene, diethyl phthalate, N-nitrosophenylamine, hexachlorobenzene, phenanthrene, anthracene, di-n-butylphthalate, fluoranthene, pyrene, butyl benzyl phthalate, benz(a)anthracene, chrysene, di-n-octylphtalate, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeo(1,2,3-c,d)pyrene, dbenz(a,h)anthracene and benzo(g,h,i)perylene are qualified as "UJ". The result for bis(2-ethylhexyl)phthalate is qualified as "J".

Recoveries for 2-fluorophenol and 2-fluorobiphenyl for sample SDC-SS05-014016C were also outside the control limits. The sample was also re-extracted and reanalyzed and surrogate recoveries met the control criteria. The results from reanalysis are reported.

7.6 Laboratory Control Sample Recoveries-*Acceptable*

LCS and LCS duplicate samples were all within the laboratory-specified control limits. The RPD for LCS and LCS duplicate was less than 40 percent, which is the laboratory's upper limit for RPD.

7.7 Matrix Spike and Matrix Spike Duplicate Recoveries-*Acceptable*

Laboratory-specified MS and MSD recoveries for phenol, 1,4-dichlorobenzene, 1,2,4-trichlorobenzene, acenaphthene, pentachlorophenol and pyrene are 17-163 percent, 25-106 percent, 47-106 percent, 54-111 percent, 29-136 percent and 53-136 percent, respectively. The MS and MSD recoveries for all compounds except for pyrene were within the control limits for samples SDC-SS01-000007, SDC-SS02-000013, SDC-SS04-000008 SDC-SS05-0000012 and SDC-SS06-000007. MS and MSD recoveries for pyrene were 137 percent and 204 percent, respectively.

The MS and MSD recoveries for 1,4-dichlorobenzene were 6 and 5 percent, respectively, and for 1,2,4-trichlorobenzene 22 and 20 percent, respectively, for samples SDC-SS01-007010C, SDC-SS02-015017C, SDC-SS03R2-002004C, SDC-SS05-014016C and SDC-SS06-008010C.

The results were not qualified based on the MS and MSD recoveries.

7.8 MS and MSD Relative Percent Differences-*Acceptable*

The RPD for MS and MSD for samples SDC-SS01-000007, SDC-SS02-000013, SDC-SS04-000008 SDC-SS05-0000012 and SDC-SS06-000007 for all compounds except for 1,4-dichlorobenzene were less than 40 percent, which is the laboratory's upper limit for RPD. The results were not qualified based on the RPD.

The RPD for 1,4-dichlorobenzene was 54 percent. The RPDs for the MS and MSD for the remaining samples were within the laboratory control limits.

7.9 Electronic Data Deliverable-*Acceptable*

Approximately 10 percent of the sample results were compared to the laboratory report. No discrepancies were noted.

7.10 Overall Assessment

All LCS and the majority of MS, MSD, and surrogate recoveries were within control limits, demonstrating that method accuracy was in control.

Organics data qualifiers are summarized in Section 12.0 of this report.

8.0 PESTICIDE ANALYSES

8.1 Laboratory Quality Control Analysis Frequencies-*Acceptable*

The following quality control samples were analyzed with each batch: method blank, matrix spike, matrix spike duplicate, and laboratory control sample.

8.2 Extraction and Analysis Holding Times-*Acceptable*

Refrigerated samples should be extracted within 14 days of collection and frozen samples within one year of collection. The extracted samples should be analyzed within 40 days of extraction. All holding time requirements were met. For re-extraction and re-analysis of DDT, a frozen sample was used for samples SDC-SS01-000007, SDC-SS02-000013, SDC-SS04-000008, SDC-SS05-0000012 and SDC-SS06-000007. Pesticides were analyzed from a frozen sample for SDC-SS06-000007.

8.3 Reporting Limits-*Acceptable*

Reporting limits for some analytes were slightly elevated due to matrix interferences for samples SDC-SS01-000007, SDC-SS02-000013, SDC-SS04-000008, SDC-SS05-0000012 and SDC-SS06-000007. Reporting limits for DDT re-analysis ranged from 3.4 to 6.3 µg/kg versus 1.0 µg/kg. (The reporting limit specified in the SAP is 1.0 µg/kg.) Reporting limits for sample SDC-SS02-015017C were slightly elevated. Reporting limits for the remaining samples were within the requirements specified in the SAP.

8.4 Laboratory Blank Results-*Acceptable*

During the initial analysis of samples SDC-SS01-000007, SDC-SS02-000013, SDC-SS04-000008 SDC-SS05-0000012 and SDC-SS06-000007, DDT was found in the method blank at concentrations greater than the MRL and therefore DDT results were not reported. No other target analytes were found in the method blank. The samples were re-extracted and reanalyzed for DDT. During the re-analysis, no target analytes were found in the method blank. No target analytes were found in the method blanks for the remaining samples.

8.5 Surrogate Recoveries-*Acceptable*

Laboratory-specified surrogate recoveries for tetrachloro-m-xylene and decachlorobiphenyl are 48-119 percent and 48-136 percent, respectively. Surrogate recoveries for all samples were within the control limits.

8.6 Laboratory Control Sample Recoveries-*Acceptable*

LCS recoveries were all within the laboratory specified control limits.

8.7 Matrix Spike and Matrix Spike Duplicate Recoveries-*Acceptable*

Laboratory specified MS and MSD recoveries for DDT, DDD, DDE, Aldrin, alpha-Chlordane, Dieldrin, gamma-BHC and Heptachlor are 16-175 percent, 30-170 percent, 12-197 percent, 28-155 percent, 21-161 percent, 14-183 percent, 48-138 percent and 32-142 percent, respectively. The MS and MSD recoveries for all samples were within the control limits. The limits did not apply to alpha-Chlordane, gamma-BHC and DDT due to matrix interferences in samples SDC-SS01-000007, SDC-SS02-000013, SDC-SS04-000008 and SDC-SS05-0000012. For sample

SDC-SS06-000007, the limits did not apply to alpha-Chlordane and DDE due to matrix interferences.

8.8 MS and MSD Relative Percent Differences-*Acceptable*

RPDs for MS and MSD for all compounds were within the laboratory-specified control limit.

8.9 Sample Confirmation

The pesticide analysis was conducted with a dual column setup. The laboratory has specified a confirmation comparison criterion of 40 percent, which is the upper limit for differences between results from the two columns. The confirmation comparison criterion was exceeded for Aldrin in sample SDC-SS01-000007 and for DDE in samples SDC-SS01-000007, SDC-SS02-000013, SDC-SS04-000008. The result reported by the laboratory was the greater of the two values. The analyte results in samples that exceeded the confirmation criterion were qualified as "P" by the laboratory. These results should be considered estimates and are qualified as "J. Also, the criterion was exceeded for DDD in SDC-SS05-0000012. However, the analyte was less than the MRL and was qualified as "J" by the laboratory.

8.10 Electronic Data Deliverable-*Acceptable*

Approximately 10 percent of the sample results were compared to the laboratory report. No discrepancies were noted.

8.11 Overall Assessment

All LCS, MS, MSD and surrogate recoveries were within control limits, demonstrating that method accuracy was in control. Sample confirmation criteria were met for most of the analytes.

Pesticide data qualifiers are summarized in Section 12.0 of this report.

9.0 PCB ANALYSES

9.1 Laboratory Quality Control Analysis Frequencies-*Acceptable*

The following quality control samples were analyzed with each batch: method blank, matrix spike, matrix spike duplicate and laboratory control sample.

9.2 Extraction and Analysis Holding Times-*Acceptable*

Refrigerated samples should be extracted within 14 days of collection and frozen samples within one year of collection. The extracted samples should be analyzed within 40 days of extraction. All holding time requirements were met.

9.3 Reporting Limits-*Acceptable*

Reporting limits for some samples were elevated slightly compared to those specified in the SAP. However, the reporting limits in the SAP are for soil, and do not take into account the moisture content of the sediments, and therefore are acceptable.

9.4 Laboratory Blank Results-*Acceptable*

No target analytes were recovered in the method blanks.

9.5 Surrogate Recoveries-*Acceptable*

The laboratory-specified surrogate recovery for decachlorobiphenyl is 57-149 percent. Most surrogate recoveries were within the control limits. The decachlorobiphenyl surrogate recovery for sample SDC-SS05-014016C exceeded the laboratory control limits. The sample was re-extracted and reanalyzed. The surrogate recoveries for the reanalyzed sample were all within the control limits. The laboratory reported results from the reanalysis.

9.6 Laboratory Control Sample Recoveries-*Acceptable*

LCS recoveries were all within the laboratory specified control limits.

9.7 Matrix Spike and Matrix Spike Duplicate Recoveries-*Acceptable*

Laboratory specified MS and MSD recoveries for Aroclor 1016 and Aroclor 1260 are 31-147 percent and 29–163 percent. The MS and MSD recoveries for most samples were within the control limits. MS recoveries for Aroclor 1016 and 1260 and MSD recovery for Aroclor 1016 in sample SDC-SS06-000007 were outside the control limits (applicable to samples SDC-SS01-000007, SDC-SS02-000013, SDC-SS04-000008 SDC-SS05-0000012 and SDC-SS06-000007). The MS recovery for Aroclor 1016 and 1260 were 159 percent and 165 percent, and the MSD recovery for Aroclor 1016 was 148 percent. The results were not qualified based on the MS and MSD recoveries.

9.8 MS and MSD Relative Percent Differences-*Acceptable*

RPDs for MS and MSD for all compounds were within the laboratory-specified control limits.

9.9 Sample Confirmation

The sample confirmation criterion of 40 percent was exceeded for Aroclor 1254 in sample SDC-SS02-000013. The associated sample result is qualified as "J"

9.10 Electronic Data Deliverable-*Acceptable*

Approximately 10 percent of the sample results were compared to the laboratory report. No discrepancies were noted.

9.11 Overall Assessment

All LCS and surrogate recoveries and most MS and MSD recoveries were within control limits, demonstrating that method accuracy was in control. Sample confirmation criterion was met for most samples and analytes.

PCB data qualifiers are summarized in Section 12.0 of this report.

10.0 ORGANOTINS

10.1 Laboratory Quality Control Analysis Frequencies-*Acceptable*

The following quality control samples were analyzed with each batch: method blank, matrix spike, matrix spike duplicate and laboratory control sample.

10.2 Extraction and Analysis Holding Times-*Acceptable*

Refrigerated samples should be analyzed within 14 days of sample collection. The sample holding times were exceeded for SDC-SS01-000007, SDC-SS02-000013, SDC-SS04-000008 and SDC-SS05-0000012. Initially, these samples were extracted and analyzed within the holding time requirements. However, re-extraction exceeded the holding time requirement by two days. The laboratory reported the initial results and re-extraction results. The initial results were rejected (see Section 10.4) despite the holding time exceedance. Due to the stability of these compounds, the holding time exceedance should not have a significant impact on the results.

Samples SDC-SS01-007010C, SDC-SS02-015017C, SDC-SS03R2-002004C, SDC-SS05-014016C and SDC-SS06-008010C were analyzed from frozen samples. PSEP guidelines do not specify whether frozen samples can be used for this analysis. Due to the stability of these compounds, it is judged that the results are valid and are not qualified.

10.3 Reporting Limits-*Acceptable*

Reporting limits requirements specified in the SAP for samples SDC-SS01-000007, SDC-SS02-000013, SDC-SS04-000008 SDC-SS05-0000012 and SDC-SS06-000007 were met except for the initial analysis of tri-n-butyltin from sample SDC-SS01-000007.

Reporting limits for samples SDC-SS01-007010C, SDC-SS02-015017C, SDC-SS03R2-002004C, SDC-SS05-014016C and SDC-SS06-008010C were slightly elevated compared to those specified in the SAP. The reporting limits in the SAP are for soil, and do not take into account the moisture content of the sediments, and therefore are acceptable.

10.4 Laboratory Blank Results-*Acceptable*

Analytes were not recovered from the laboratory blank. However, the surrogate recovery in the method blank for samples SDC-SS01-000007, SDC-SS02-000013, SDC-SS04-000008 SDC-SS05-0000012 and SDC-SS06-000007 was 3 percent, which is greater than the laboratory's control limits for tri-n-propyltin (22-113 percent). Samples were re-extracted and analyzed. No analytes were recovered in the method blank, and the surrogate recovery in the method blank was within laboratory's control limits. Original results were reported for SDC-SS06-000007 while original results and results from re-analysis were reported for SDC-SS01-000007, SDC-SS02-000013, SDC-SS04-000008 and SDC-SS05-0000012. The original results for SDC-SS01-000007, SDC-SS02-000013, SDC-SS04-000008 and SDC-SS05-0000012 were rejected in favor of the more accurate results.

The surrogate recovery in the method blank for samples SDC-SS01-007010C, SDC-SS02-015017C, SDC-SS03R2-002004C, SDC-SS05-014016C and SDC-SS06-008010C was 17 percent, which was also less than the laboratory control limits. Samples were not re-extracted because no analytes were recovered in the samples. The associated results for tetra-n-butyltin, tri-n-butyltin, di-n-butyltin and n-butyltin for these samples were qualified as "UJ".

10.5 Surrogate Recoveries-*Acceptable*

Laboratory-specified surrogate recovery for tri-n-propyltin is 22-113 percent. Surrogate recoveries were within the control limits in all samples.

10.6 Laboratory Control Sample Recoveries-*Acceptable*

LCS recoveries were all within the laboratory-specified control limits.

10.7 Matrix Spike and Matrix Spike Duplicate Recoveries-*Acceptable*

Laboratory-specified MS and MSD recoveries for tetra-n-butyltin, tri-n-butyltin, di-n-butyltin and n-butyltin are 25-125 percent, 12- 138 percent, 10-155 percent and 10-99 percent, respectively. During the initial analysis the MS and MSD recoveries were within control limits for samples SDC-SS01-000007, SDC-SS02-000013, SDC-SS04-000008 SDC-SS05-0000012 and SDC-SS06-000007. Recoveries for all MSD compounds were greater than the control criteria for a Batch Quality Control sample for the analysis of the re-extracted samples. The sediment sample that received the matrix spikes was not one of the samples collected in this study.

MS and MSD recoveries for tetra-n-butyltin were 21 percent, and for n-butyltin 2 and 6 percent, respectively, for samples SDC-SS01-007010C, SDC-SS02-015017C, SDC-SS03R2-002004C, SDC-SS05-014016C and SDC-SS06-008010C. The laboratory suspected matrix interferences with these samples. No results were qualified based on the MS and MSD recoveries.

10.8 MS and MSD Relative Percent Differences-*Acceptable*

RPDs for MS and MSD for all compounds were within the laboratory-specified control limits for samples SDC-SS01-000007, SDC-SS02-000013, SDC-SS04-000008 SDC-SS05-0000012 and SDC-SS06-000007

RPD for MS and MSD for n-butyltin was 115 percent, which is greater than the laboratory specified control limit for samples SDC-SS01-007010C, SDC-SS02-015017C, SDC-SS03R2-002004C, SDC-SS05-014016C and SDC-SS06-008010C. No results were qualified based on the MS and MSD RPDs.

10.9 Sample Confirmation

The organotin analysis was conducted with a dual column setup. The laboratory has specified a confirmation comparison criterion of 40 percent, which is the upper limit for differences between results from the two columns. The confirmation comparison criterion was exceeded for di-n-butyltin in samples SDC-SS04-000008 and in SDC-SS02-000013 during the initial analysis. The greater of the two values is reported, and the results for SDC-SS02-000013 were qualified by the laboratory as "P". The results for SDC-SS04-000008 were not qualified by the laboratory. For this report, the results for these two samples are not qualified since the results are rejected.

10.10 Electronic Data Deliverable-*Acceptable*

If the results were correctly transcribed in the EDD, approximately 10 percent of the samples were checked. No discrepancies were noted.

10.11 Overall Assessment

All LCS, surrogate and most MS and MSD recoveries met the control criteria, demonstrating that method accuracy was in control.

11.0 PAHS

The following samples were analyzed for PAHs: SDC-SS01-007008, SDC-SS01-010011, SDC-SS02-013014, SDC-SS02-016017, SDC-SS03R2-001002, SDC-SS03R2-005006, SDC-SS05-012013, SDC-SS05-015016, SDC-SS06-007008 and SDC-SS06-010011.

11.1 Laboratory Quality Control Analysis Frequencies-*Acceptable*

The following quality control samples were analyzed with each batch: method blank, matrix spike, matrix spike duplicate, laboratory control sample and laboratory control sample duplicate.

11.2 Extraction and Analysis Holding Times- *Acceptable*

Refrigerated samples should be extracted within 14 days of collection and frozen samples within one year of collection. Extracted samples should be analyzed within 40 days of extraction. All holding time requirements were met.

11.3 Reporting Limits-*Acceptable*

All samples met the reporting limit requirements specified in the SAP.

11.4 Laboratory Blank Results-*Acceptable*

No target analytes were recovered in the method blanks.

11.5 Surrogate Recoveries-*Acceptable*

Laboratory-specified surrogate recovery limits for biphenyl-d10, fluorene-d10, fluoranthene-d10 and p-terphenyl-d14 are 39-99 percent, 43-98 percent, 52-108 percent and 54-158 percent, respectively. The surrogate recoveries for all samples were within the control limits.

11.6 Laboratory Control Sample Recoveries-*Acceptable*

LCS and LCS duplicate recoveries were all within laboratory-specified control limits.

11.7 Matrix Spike and Matrix Spike Duplicate Recoveries-*Acceptable*

The MS and MSD recoveries for all compounds were within laboratory-specified control limits.

11.8 MS and MSD Relative Percent Differences-*Acceptable*

RPDs for indeno(1,2,3-c,d)pyrene, dibenz(a,h)anthracene and benzo(g,h,i)perylene in samples SDC-SS06-007008 and SDC-SS06-010011 were greater than the laboratory-specified control limit of 40 percent. Their respective RPDs were 41 percent, 43 percent and 43 percent. RPDs for other compounds in these two samples were generally greater than 30 percent. The RPDs for the remaining samples were within the laboratory-specified control limit.

11.9 Electronic Data Deliverable-*Acceptable*

Approximately 10 percent of the sample results were compared to the laboratory report. No discrepancies were noted.

11.10 Overall Assessment

All LCS, surrogate, MS and MSD recoveries were within control limits, demonstrating that method accuracy was in control.

12.0 SUMMARY OF QUALIFIED DATA

Table 1 (attached) presents data qualifiers assigned during the data validation process. Table 1a presents definitions of those qualifiers.

13.0 REFERENCES

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U.S. Army Corps of Engineers (USACE). 1998. Dredged Material Evaluation Framework: Lower Columbia River Management Area. Public Review Draft. April 1998.

United States Environmental Protection Agency (USEPA). 1994. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods. Office of Solid Waste and Emergency Response. Washington, D.C. September 1994. EPASW-846. 3rd Edition.

USEPA. 1999. Contract Laboratory Program National Functional Guidelines for Organic Data Review, Office of Emergency and Remedial Response. Washington, D.C. October 1999. EPA540/R-99/008.

USEPA. 2002. Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, Office of Emergency and Remedial Response. Washington, D.C. July 2002, EPA540/R-01/008.

Table 1 Summary of Qualified Data			
Sample ID	**Analyte**	**DV Qualifier**	**Qualifier Reason**
SDC-SS01-000007	Antimony	J	Low MS recovery, no post-digestion spike
SDC-SS02-000013	Antimony	J	Low MS recovery, no post-digestion spike
SDC-SS04-000008	Antimony	J	Low MS recovery, no post-digestion spike
SDC-SS05-0000012	Antimony	J	Low MS recovery, no post-digestion spike
SDC-SS06-000007	Antimony	J	Low MS recovery, no post-digestion spike
SDC-SS01-007010C	Antimony	UJ	Low MS recovery, no post-digestion spike
SDC-SS02-015017C	Antimony	J	Low MS recovery, no post-digestion spike
SDC-SS3R2-002004C	Antimony	J	Low MS recovery, no post-digestion spike
SDC-SS05-014016C	Antimony	J	Low MS recovery, no post-digestion spike
SDC-SS06-008010C	Antimony	J	Low MS recovery, no post-digestion spike
SDC-SS01-000007	Aldrin	J	Sample confirmation criterion exceeded
SDC-SS01-000007	DDE	J	Sample confirmation criterion exceeded
SDC-SS02-000013	DDE	J	Sample confirmation criterion exceeded
SDC-SS04-000008	DDE	J	Sample confirmation criterion exceeded
SDC-SS02-000013	Aroclor 1254	J	Sample confirmation criterion exceeded
SDC-SS01-000007	Tetra-n-butyltin	R1	More accurate result
SDC-SS01-000007	Tri-n-butyltin	R1	More accurate result
SDC-SS01-000007	di-n-butyltin	R1	More accurate result
SDC-SS01-000007	n-butyltin	R1	More accurate result
SDC-SS02-000013	Tetra-n-butyltin	R1	More accurate result
SDC-SS02-000013	Tri-n-butyltin	R1	More accurate result
SDC-SS02-000013	di-n-butyltin	R1	More accurate result
SDC-SS02-000013	n-butyltin	R1	More accurate result
SDC-SS04-000008	Tetra-n-butyltin	R1	More accurate result
SDC-SS04-000008	Tri-n-butyltin	R1	More accurate result
SDC-SS04-000008	di-n-butyltin	R1	More accurate result
SDC-SS04-000008	n-butyltin	R1	More accurate result
SDC-SS05-0000012	Tetra-n-butyltin	R1	More accurate result
SDC-SS05-0000012	Tri-n-butyltin	R1	More accurate result

Table 1 Summary of Qualified Data			
Sample ID	**Analyte**	**DV Qualifier**	**Qualifier Reason**
SDC-SS05-0000012	di-n-butyltin	R1	More accurate result
SDC-SS05-0000012	n-butyltin	R1	More accurate result
SDC-SS01-007010C	Tetra-n-butyltin	UJ	Surrogate recovery in method blank
SDC-SS01-007010C	Tri-n-butyltin	UJ	Surrogate recovery in method blank
SDC-SS01-007010C	di-n-butyltin	UJ	Surrogate recovery in method blank
SDC-SS01-007010C	n-butyltin	UJ	Surrogate recovery in method blank
SDC-SS02-015017C	Tetra-n-butyltin	UJ	Surrogate recovery in method blank
SDC-SS02-015017C	Tri-n-butyltin	UJ	Surrogate recovery in method blank
SDC-SS02-015017C	di-n-butyltin	UJ	Surrogate recovery in method blank
SDC-SS02-015017C	n-butyltin	UJ	Surrogate recovery in method blank
SDC-SS03R2-002004C	Tetra-n-butyltin	UJ	Surrogate recovery in method blank
SDC-SS03R2-002004C	Tri-n-butyltin	UJ	Surrogate recovery in method blank
SDC-SS03R2-002004C	di-n-butyltin	UJ	Surrogate recovery in method blank
SDC-SS03R2-002004C	n-butyltin	UJ	Surrogate recovery in method blank
SDC-SS05-014016C	Tetra-n-butyltin	UJ	Surrogate recovery in method blank
SDC-SS05-014016C	Tri-n-butyltin	UJ	Surrogate recovery in method blank
SDC-SS05-014016C	di-n-butyltin	UJ	Surrogate recovery in method blank
SDC-SS05-014016C	n-butyltin	UJ	Surrogate recovery in method blank
SDC-SS06-008010C	Tetra-n-butyltin	UJ	Surrogate recovery in method blank
SDC-SS06-008010C	Tri-n-butyltin	UJ	Surrogate recovery in method blank
SDC-SS06-008010C	di-n-butyltin	UJ	Surrogate recovery in method blank
SDC-SS06-008010C	n-butyltin	UJ	Surrogate recovery in method blank
SDC-SS03R2-002004C	1,3-dichlorobenzene	UJ	Surrogate recovery
SDC-SS03R2-002004C	1,4-dichlorobenzene	UJ	Surrogate recovery
SDC-SS03R2-002004C	1,2-dichlorobenzene	UJ	Surrogate recovery
SDC-SS03R2-002004C	Benzyl alcohol	UJ	Surrogate recovery
SDC-SS03R2-002004C	Hexachloroethane	UJ	Surrogate recovery
SDC-SS03R2-002004C	1,2,4-trichlorobenzene	UJ	Surrogate recovery
SDC-SS03R2-002004C	Naphthalene	UJ	Surrogate recovery

Table 1 Summary of Qualified Data			
Sample ID	**Analyte**	**DV Qualifier**	**Qualifier Reason**
SDC-SS03R2-002004C	Hexachlorobutadiene	UJ	Surrogate recovery
SDC-SS03R2-002004C	2-methylnaphthalene	UJ	Surrogate recovery
SDC-SS03R2-002004C	Acenaphthylene	UJ	Surrogate recovery
SDC-SS03R2-002004C	Dimethyl phthalate	UJ	Surrogate recovery
SDC-SS03R2-002004C	Acenaphthene	UJ	Surrogate recovery
SDC-SS03R2-002004C	Dibenzofuran	UJ	Surrogate recovery
SDC-SS03R2-002004C	Fluorene	UJ	Surrogate recovery
SDC-SS03R2-002004C	Diethyl phthalate	UJ	Surrogate recovery
SDC-SS03R2-002004C	N-nitrosophenylamine	UJ	Surrogate recovery
SDC-SS03R2-002004C	Hexachlorobenzene	UJ	Surrogate recovery
SDC-SS03R2-002004C	Phenanthrene	UJ	Surrogate recovery
SDC-SS03R2-002004C	Anthracene	UJ	Surrogate recovery
SDC-SS03R2-002004C	Di-n-butyl phthalate	UJ	Surrogate recovery
SDC-SS03R2-002004C	Fluoranthene	UJ	Surrogate recovery
SDC-SS03R2-002004C	Pyrene	UJ	Surrogate recovery
SDC-SS03R2-002004C	Butyl benzyl phthalate	UJ	Surrogate recovery
SDC-SS03R2-002004C	Benz(a)anthracene	UJ	Surrogate recovery
SDC-SS03R2-002004C	Chrysene	UJ	Surrogate recovery
SDC-SS03R2-002004C	Di-n-octyl phthalate	UJ	Surrogate recovery
SDC-SS03R2-002004C	Benzo(b)fluoranthene	UJ	Surrogate recovery
SDC-SS03R2-002004C	Benzo(k)fluoranthene	UJ	Surrogate recovery
SDC-SS03R2-002004C	Benzo(a)pyrene	UJ	Surrogate recovery
SDC-SS03R2-002004C	Indeno(1,2,3-c,d)pyrene	UJ	Surrogate recovery
SDC-SS03R2-002004C	Dibenz(a,h)anthracene	UJ	Surrogate recovery
SDC-SS03R2-002004C	Benzo(g,h,i)perylene	UJ	Surrogate recovery
SDC-SS03R2-002004C	Bis(2-ethylhexyl)phthalate	J	Surrogate recovery

Table 1a Qualifiers and Definitions	
DV Qualifier	**Definition**
U	The material was analyzed for, but was not detected at levels greater than the level of the associated value.
UM	Indicates an analyte that was not detected, and where a matrix effect was present.
J	The associated value is an estimate.
UJ	The material was analyzed for, but was not detected at levels greater than the level of the associated value. The quantitation limit is approximate and may or may not represent the actual limit of quantitation.
R1	This sample result has been rejected in favor of a more accurate and/or precise result. The other result should be used.

APPENDIX D – UNDERWATER SLOPE EVALUATION

GRI Geotechnical & Environmental Consultants
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Portland, Oregon 97005-3364
PHONE 503/641/3478 FAX 503/644/8034

June 10, 2003

3776 GEOTECHNICAL RPT

Parsons Brinckerhoff Quade & Douglas, Inc.
400 SW Sixth Avenue, Suite 802
Portland, OR 97204

Attention: Jerald Ramsden

SUBJECT: Underwater Slope Evaluation
Dredging at Schnitzer International Terminal
Portland, Oregon

At your request, GRI has evaluated the underwater slopes at the slip and along the Willamette River at Schnitzer International Terminal. The Vicinity Map, Figure 1, shows the general location of the facility, which is located between river mile 3.6 and 4.1 on the east bank of the Willamette River. We understand there is a present need to deepen the berths along the river and deepen and widen the berths in the slip. Our evaluation has consisted of the review of available geotechnical information for the site, development of slope stability models, and engineering studies and analyses. This report describes the work accomplished, summarizes our conclusions regarding slope stability, and provides our recommendations for the proposed dredging and measures to mitigate the effects of the dredging on stability of the slopes and the existing pile-supported structures. All elevations in this report are based on Columbia River datum (CRD).

PROJECT DESCRIPTION

The Site Plans, Figures 2 and 3, show the configuration of the slip and riverbank as well as the topography of the above- and below-water slopes. We understand the proposed work in the slip area will include deepening the mudline to about elevation –42 to –36 ft in the area of the existing dock. In addition, the channel in the slip may be widened to establish a berth width of about 115 ft or wider. On the riverside of the facility, the proposed dredging would include deepening the mudline from a current elevation of about –35 ft to about elevation –42 ft along a 1,500 lineal ft section of river. Based on the topographic information and a visit to the site, the above-water slopes along the river are typically in the range of 1H:1V to 2H:1V, with locally steeper and flatter areas.

BACKGROUND INFORMATION

Background information regarding the design and construction of the existing dock, cantilever sheetpile wall, anchored bulkhead, and subsurface and underwater conditions at the site is documented in the following reports:

"Schnitzer Investment Corp., International Terminal, Foundation Investigation," by Foundation Sciences, Inc., dated December 1973.

"Geotechnical Investigation, Modifications to Schnitzer Steel Facility Dock, Portland, Oregon" by GRI, dated October 16, 2002.

Our recent experience with the Schnitzer facility dock (GRI, 2002) and review of the report by FSI (1973) provide the majority of our current understanding regarding subsurface conditions at the site and the history of the original design and construction of the docks.

SITE DESCRIPTION

Existing Conditions

An existing dock with a deck elevation of +25 ft is present along the south side of the slip and extends from the river eastward to within about 250 ft of the end of the slip. At berth 1 (Station 0+00 to 6+00, Figure 1), the south (inner) half of the dock is currently supported by timber piles, and the north (outer) portion of the dock is supported on 26-in.-diameter steel pipe piles. As you know, modifications to berth 1 are currently under construction and include the installation of 24-in.-diameter steel pipe piles to support a new container crane. At berths 2 (Station 6+00 to 13+0, Figure 1) and 3 (Station 13+80 to 16+80, Figure 1), the dock is supported entirely on timber piles. The lengths of the existing timber and steel piles are not known as neither driving records nor as-built plans are available. An anchored tied-back soldier pile bulkhead is located along the south side of the dock and supports the edge of the steel yard. The steel yard is at elevation +25 ft. The soldier piles for the bulkhead consist of 40-ft-long steel H-piles on 10-ft centers. The bulkhead is a wide-flange/plate assembly about 10 to 12 in. thick, with wide flange stiffener members between steel plates that extend to about elevation +5 ft. We further understand the anchor is located about 6 ft below the top of each H-pile and consists of a 1¾-in.-diameter steel rod connected to a deadman anchor placed in the backfill an unknown distance behind the wall. The mudline in front of the tied-back bulkhead is at about elevation +10 ft and slopes downward to the north under the dock at a slope of about 2H:1V to the top of a submerged cantilever sheetpile wall at about elevation -15 ft. The cantilever sheetpile wall extends to a tip elevation of about -75 ft. The bulkhead and cantilever sheetpile wall are separated by a horizontal distance of about 50 ft. The mudline elevation in front of the cantilever sheetpile varies along the length of the wall; however, we understand it is typically on the order of elevation –40 and –39 ft at the west and east end of berth 1; respectively; elevation –39 and –23 ft at the west and east end of berth 2; respectively, and elevation –23 and –15 ft at the west and east end of berth 3; respectively.

Geology and Groundwater

The existing ground surface along the riverbank in the area of the proposed dredging is relatively flat and was created by placing dredged sand fill over alluvial floodplain deposits. The subsurface information for the site developed by FSI and GRI indicates the thickness of the fill varies; however, it is generally on the order of 25 ft thick along the river and thins inland to about 10 ft at the east end of the dock in the slip. The floodplain deposits that underlie the fill typically consist of fine-grained sand with varying amounts of silt near the river and transition inland to silt and clayey silt with lenticular interbeds of sand silt, silty sand, and locally thicker layers of fine-grained sand. The alluvial soils are generally underlain by gravel of the Troutdale Formation at depths below about elevation –150 ft.

Groundwater levels across this portion of the floodplain are expected to fluctuate in response to river level and, to a lesser extent, precipitation. We understand the 100-year flood level at the site is about elevation +26.1 ft, and the ordinary high and low water levels are about elevation +15.2 and +3.0 ft, respectively. We anticipate perched groundwater conditions may periodically develop locally above the less-permeable floodplain deposits and within the dredged sand cap that mantles the site.

Subsurface Conditions

According to the information provided in the above-referenced reports and our visits to the site, the riverbank on the south side of the slip is retained by an anchored bulkhead and underwater cantilever sheetpile wall. A dock is present between the bulkhead and cantilever sheetpile wall. The bulkhead retains the edge of the steel yard, which is at elevation +25 ft. The surface of the steel yard is paved with asphaltic concrete and Portland cement concrete. The pavement is underlain by dredged sand fill that varies from about 10 and 25 ft thick. The sand fill is generally medium dense, fine to medium grained, and contains up to a trace of silt. Alluvial deposits of silt and sand underlie the sand fill. Near the river, the alluvial deposits typically consist of medium dense, fine to medium grained sand that contains varying amounts of silt. Farther inland, the alluvial sand become siltier and transition to medium stiff to stiff silt with varying amounts of fine-grained sand and clay. The silt is underlain by medium dense to dense, fine-grained sand at depths of more than 90 to 100 ft (elevation –65 to –75 ft). Logs of the subsurface explorations for the above-referenced reports are provided in Appendix A.

FSI Stability Model

As referenced above, Foundation Sciences, Inc. (FSI) performed a subsurface investigation and stability analysis for the slopes beneath the dock in 1973. The purpose of the work by FSI was to evaluate the length and embedment of a sheetpile wall necessary to stabilize the slope beneath the dock, assuming a mudline elevation of –33 ft. The model developed by FSI assumes the bulkhead and sheetpile walls are individually stable, and the critical surface passes under the bulkhead and sheetpile wall, i.e., the FSI model assumed global stability controls. The FSI analysis was performed under static conditions, with the critical water surface located at elevation –5 ft. A uniform live load of 500 psf surcharge was applied in the area behind the tied-back bulkhead. The report concluded that a sheetpile wall 55 ft deep was necessary for stability at a minimum water level with a channel bottom of elevation –33 ft. The report does not indicate what embedment is necessary with a mudline at elevation –33 ft; however, the report recommended the sheetpile wall be embedded at least 22 ft below the channel bottom where the mudline was other than elevation –33 ft. Neither stability calculations nor factor of safety values are presented in the FSI report. Based on the available information, we understand the sheetpiles were installed to a final tip elevation of –73 ft. The slip has subsequently been dredged to a mudline elevation of about –40 ft in berth 1.

CONCLUSIONS AND RECOMMENDATIONS

General

As currently envisioned, the slip and river berths will be dredged to accommodate deeper and wider draft vessels. Berths 1, 2, and 3 in the slip will be dredged to about elevations –42, –38, and –36 ft; respectively, requiring 2 to 20 ft of deepening based on the current mudline elevation. In addition, the channel in the slip may be widened to establish a berth width of at least 115 ft. Berths 4 and 5 in the river will be dredged to about elevation –42 ft from a current mudline elevation of about –35 ft.

Based on the available subsurface information, the soils on the bottom of the slip in the area of the proposed dredging likely consist of medium dense sand on the west half and transition to medium stiff silt on the east half. It is also likely the river bottom consists of medium dense sand. We anticipate a thickness of loose, soft sediments has likely been deposited on the bottom of the slip since it was last dredged. The

thickness of sediments will likely vary by location in the slip and could be several feet thick. Due to river currents, the thickness of these sediments on the river bottom is likely less than in the slip.

Groundwater levels across this portion of the floodplain fluctuate in response to river levels and, to a lesser extent, precipitation. Changes in the groundwater level lag behind changes in river level. This periodically results in unbalanced conditions that are typically most critical for the overall stability of the riverbank. The largest unbalanced condition occurs when river levels quickly recede after flood events or prolonged periods of high water. For more usual conditions, when groundwater levels closely follow river levels, a low river level generally represents the worst-case condition for the stability of slopes along the waterfront.

Using the information discussed above, we have developed slope stability models to evaluate the effects of the proposed dredging on stability of the slip and riverbank slopes. The following sections of this report discuss the models developed, summarize our conclusions regarding the stability of the slopes, and provide recommendations for measures to mitigate the effects the proposed dredging will have on the overall stability of the slopes and the existing pile-supported dock, bulkhead, and sheetpile wall.

Stability Models

General. Computer-aided slope stability models were developed for the slopes at the berths to analyze the existing conditions and a deepened dredge depth. Modeling for local stability and global stability were performed. The models are two-dimensional and were developed using the Slope/W program, a software package developed by GEO-SLOPE International, Ltd., of Calgary, Alberta, Canada. Factors of safety against sliding were computed using Spencer's Method of Slices, which satisfies both force and moment equilibrium while assuming the resultant of interslice forces are of constant orientation throughout the sliding mass. The computed factor of safety is defined as the ratio of the forces (or moments) tending to resist sliding to the forces (or moments) tending to cause sliding within the slope. Computed factors of safety less than 1.0 represent potentially unstable conditions.

The program allows for defining potential failure surfaces within the slope as being either circular or a series of piece-wise linear segments. Automatic search routines can be used with circular surfaces to begin identifying the region within the slope near the critical surface. The critical surface is the potential failure surface with the lowest calculated factor of safety against sliding within the slope. Recognizing that a sliding surface is not always necessarily best approximated as a circular surface, piece-wise linear surfaces can then be manually input to further investigate or refine the shape of the critical surface. Because of the significantly different slope geometries between the slip and the river, the results of our stability studies are discussed separately in the following sections.

Properties of the materials comprising the slopes are based on our current understanding of subsurface conditions at the site. A total unit weight of 120 pcf and an angle of internal friction of 35° were used for the sand fill that mantles the upland portions of the site. A total unit weight of 110 to 115 pcf and an angle of internal friction of 34 to 35° were used for the alluvial silt layers present at the east portion of the site. A total unit weight of 120 pcf and an angle of internal friction of 35° were used for the alluvial deposits of sand that underlie the fill and silt at the site. A uniform live load of 1,000 psf was applied over the area behind the dock in the slip. An undrained shear strength in the range of 600 to 800 psf was also input into the model to analyze the undrained condition possible during dredging. All of our models assume a river

and groundwater level at elevation 0 ft and static conditions (no earthquake). The models in the slip assume the tied-back bulkhead and sheetpile walls are structurally stable.

In our analyses, we have not assumed any stabilizing effect that the existing dock piles may have on the overall stability of the slope in the slip. In general, the dock piles will tend to increase the actual factor of safety against sliding to some extent, and some pile contribution to the overall stability could be assumed if the critical surface passes through the pile zone. Methods exist to accomplish this by applying an increased strength factor to the soil that is proportional to the bending strength of the piles averaged over the area between piles. However, based on our experience with these methods, we expect the piles will provide only a relatively small increase in the factor of safety, since the spacing between the piles is relatively wide compared with the soil's ability to arch across the distance between the piles. This further assumes the piles would begin to carry a substantial amount of horizontal load from the slope in bending that could lead to undesirable deformations or other adverse impacts to the dock structure.

Slip. Several models and failure modes were analyzed as part of this stability investigation. As previously discussed, the configuration of the slopes in the slip at the location of the dock vary from west to east. In berths 1 and 2, an anchored bulkhead is located on the landside of the dock, and a cantilever sheetpile wall is present on the outboard side of the dock. In berth 3, only the anchored bulkhead is present, and the mudline under the dock slopes downward to the bottom of the channel at about 2H:1V.

Berth 1 and 2. As part of our analysis, we evaluated the global stability of the slopes in berths 1 and 2. Our representative model is based on the cross section at station 6+00 and assumes a mudline varying from elevation -30 to -42 ft; which represents the range of elevations under existing and final dredged conditions. A user-defined circular failure surface passing under the sheetpiles at an elevation of -75 ft was assumed as representative global failure surface. An illustration of our stability model for this condition is provided on Figure 4. Our model indicates a computed factor of safety of about 2.0 and 2.5 for a mudline of elevation -30 and -42 ft; respectively. In our opinion, the computed factor of safety value indicates an acceptably stable slope against a global failure with the mudline between elevation -30 and -42 ft. In our opinion, the area in front of the sheetpile wall could be dredged to elevation -42 ft in berths 1 and 2 while maintaining an acceptable factor of safety against a global failure.

The conclusion above assumes that forces and deflections in the sheetpile wall are within allowable limits. In this regard, the structural integrity of the sheetpile wall should be analyzed by a qualified structural engineer prior to dredging. A lateral earth pressure diagram to assist in evaluating the existing cantilever sheetpile wall is shown on Figure 5. The diagram allows for varying dredging depths (H_1) assuming a 3H:1V slope is maintained from the face of the sheetpile wall. In our opinion, the loading from the dock provides a substantial lateral earth pressure behind the wall and is difficult to quantify. As shown on Figure 5, the load is represented as a uniform surcharge about 20 ft below the existing riverbank surface behind the sheetpile wall, which in our opinion, is a reasonable depth. However, we acknowledge that there is some uncertainty in the actual location and magnitude of this load; therefore, we recommend varying the location of the dock surcharge (i.e., the distance Hs) to evaluate the sensitivity of the stresses in the sheetpile wall due the location of the dock surcharge.

Also, it should be noted that the passive resistance values shown on Figure 5 are ultimate values (i.e., factor of safety equals 1.0). The wall will likely be required to move on the order of 2 to 3 in. horizontally

outward into the slip to mobilize this amount of passive resistance. In this regard, a factor of safety of about 1.5 to 2.0 is typically applied to the passive resistance values to limit movement to smaller amounts.

Although not related to the effects of dredging, it should be noted that our recent modeling indicates the global failure discussed above does not represent the critical surface within the slope. The stability surrounding the upland bulkhead was also analyzed. As shown on Figure 4, a user-defined failure surface was placed passing below the wide-flange/plate assembly of the bulkhead and through the zone of soil supporting the H-piles. In our opinion, the H-Piles will provide a negligible amount of soil reinforcement due to there relatively wide spacing. Our model indicates a computed factor of safety of about 0.95 with a uniform live load of 1,000 psf. The analysis indicates a factor of safety of 1.10 without the surcharge. Based on the results of our analysis, the stability of the anchored bulkhead has a lower factor of safety than is commonly considered acceptable. Therefore, we recommend this condition be reviewed with Schnitzer and they consider limiting the amount of surcharge in the area behind the existing anchored bulkhead.

Berth 3. The configuration of the slopes at berth 3 is somewhat different than at berths 1 and 2. The significant difference is that the cantilever sheetpile wall is not present, and the mudline beneath the dock slopes downward from the bulkhead to the bottom of the channel at about a 2H:1V. However, the dock at this location is similar to berth 2 in that it is supported entirely on timber piles.

As part of our analysis of berth 3, we first calculated the critical surface within the slope under existing conditions with a representative model based on the cross section at station 15+55. An illustration of this stability model is provided on Figure 6. Our model indicates a factor of safety of slightly less than 1.0 with a 1,000 psf uniform surcharge. Without a surcharge the factor of safety increases slightly to 1.05. In addition, a critical surface exists beneath the bulkhead, as shown previously on Figure 4, and has a similar factor of safety. Based on the results of our analysis, the stability of the bulkhead at this location has a lower factor of safety than is commonly considered acceptable. Therefore, we recommend that this condition be reviewed with Schnitzer and they consider limiting the amount of surcharge in the area behind the existing anchored bulkhead, similar to what was recommended above for berths 1 and 2. In addition to the global stability of the bulkhead, the local stability of the existing 2H:1V mudline beneath the dock was also analyzed. Our analyses indicate a minimum factor of safety of about 1.4 against a local failure for the existing slope beneath the dock.

Our model was then used to predict the likely effect that deepening by dredging would have on the stability of the slope assuming an unsupported, vertical cut from elevation -25 ft to -36 ft at the face of the dock. The model identified circular surfaces with factors of safety less than 1.0 that begin at the toe of the cut and propagate upward through the lower portion of the slope as illustrated on Figure 7. These initially small failures can progressively lead to a larger failure once the top of these surfaces intersects the lower portion of the critical surface previously identified for the existing conditions. In this scenario, the material at the toe of the slope has progressively failed into the slip, resulting in less support for the remaining upslope material. This will tend to further reduce an already low computed factor of safety for the larger surface. On this basis, we conclude that making an unsupported cut at the toe of the slope to deepen the dredge depth at the face of the dock could begin a progressive failure that may ultimately propagate upslope to the area behind the dock. In order maintain the existing stability of the slopes after dredging, the mudline in front of the dock would have to be maintained at the current slope angle which is on the order of 2H:1V.

North Shore of Slip. The effects of dredging on the slopes on north side of the slip were also analyzed using the hydrographic data shown on Figures 2. The elevation and thickness of each distinct soil layer, as well as the water level, was assumed as the same as for berths 3 directly across the slip. Soil properties for the north shore of the slip consisted of the values discussed previously. The automatic search routine was used to identify circular surfaces to begin identifying the region within the slope near the critical surface. In addition, piece-wise linear surfaces were then manually input to further investigate and refine the shape of the critical surfaces. Our analyses indicate minimum factor of safety values of about 2.0 to 3.0 prior to and after dredging. Based on our analysis, and review of the hydrographic data, the proposed dredging will not adversely effect the stability of the slopes along the north side of the slip assuming the dredged slopes are not steeper than about 3H:1V, and the overall slope above the dredged line is no steeper than about 2H:1V.

Berth 4 and 5. The effects of dredging in the river at berth 4 and 5 were analyzed at cross sections 2+10 and 14+30, respectively. A representative model based on the available hydrographic data is shown on Figure 8. The automatic search routine was used to identify circular surfaces to begin identifying the region within the slope near the critical surface. In addition, piece-wise linear surfaces were then manually input to further investigate and refine the shape of the critical surfaces. Our analyses indicate minimum factor of safety values of the local underwater slopes and the entire riverbank (global stability), are in the range of about 1.5 to 2.0 prior to and after dredging. Based on our analysis, and review of the hydrographic data, the proposed dredging will not adversely effect the overall stability of the slopes along river assuming the dredged slopes are not steeper than about 3H:1V. We understand that, achieving the final dredge elevation of -42 ft and maintaining a 3H:1V slope would result in an excavation that will remove part of the above water slopes and steel yard. In our opinion, the top of the dredged slope can be "day-lighted" below the water line while still maintaining a dredged slope of about 3H:1V. The dredged can be made slightly steeper then 3H:1V (i.e., 18°), on the order of 2° or 3°, without significantly reducing the stability of the riverbank.

As part of our work, we visited the site to observe the existing riverbank slopes. Based on our observations at the site, a significant portion of the riverbank slopes are as steep as 1H:1V with locally steeper areas. These slopes on the upper riverbank are steeper than is commonly considered acceptable. Therefore, we recommend that this condition be reviewed with Schnitzer and that they consider avoiding placement of heavy objects and materials on the riverbank west of the railroad tracks. However, the proposed dredging should not effect the local stability of the upper river bank slopes.

Other Considerations

To reflect the current understanding of the potential seismicity of the Pacific Northwest, the Portland area is presently assigned to seismic zone 3 in the most recent edition of the Uniform Building Code (UBC). Since some of the hydraulically placed fill that mantles the site and the underlying alluvial soils are considered to be relatively loose, we anticipate that liquefaction of these soils would likely result from a strong local seismic event. Consequently, the UBC soil profile type for the site should be considered S_F. Although a site-specific seismic hazards study is beyond the scope of this investigation, we anticipate that seismically induced liquefaction at this site may produce lateral spreading of the slopes along the slip and riverfront and settlement of the ground surface of the steelyard. Our analyses and conclusions do not account for any seismic loading. Substantial deformations of the bulkhead, sheetpile wall and dock structure in the slip should be expected based on the relatively low factor of safety for the existing slope and the likely

relatively large magnitude of lateral spreading anticipated as a result of a strong UBC zone 3 type seismic event.

LIMITATIONS

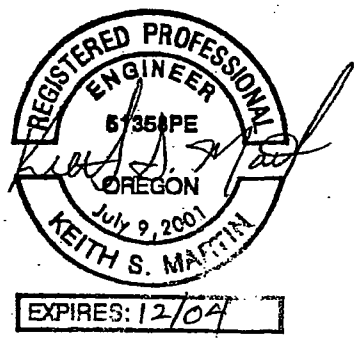
This report has been prepared to aid the owner in the design of this project. The scope is limited to the specific project and location described herein, and our description of the project represents our understanding of the existing slopes, structures and underlying soil conditions at the site. In the event that any changes in the dredging plan or the project elements as outlined in this report are planned, we should be given the opportunity to review the changes and to modify or reaffirm the conclusions and recommendations of this report in writing.

The conclusions and recommendations submitted in this report are based on our understanding of the existing conditions at this site based on review of the available historic records discussed in this report. This report does not reflect any variations in subsurface conditions that may be different from those described in the available information. The nature and extent of variation may not become evident until construction. If, during construction, subsurface conditions different from those described in this report are observed or encountered, we should be advised at once so that we can observe and review these conditions and reconsider our recommendations where necessary.

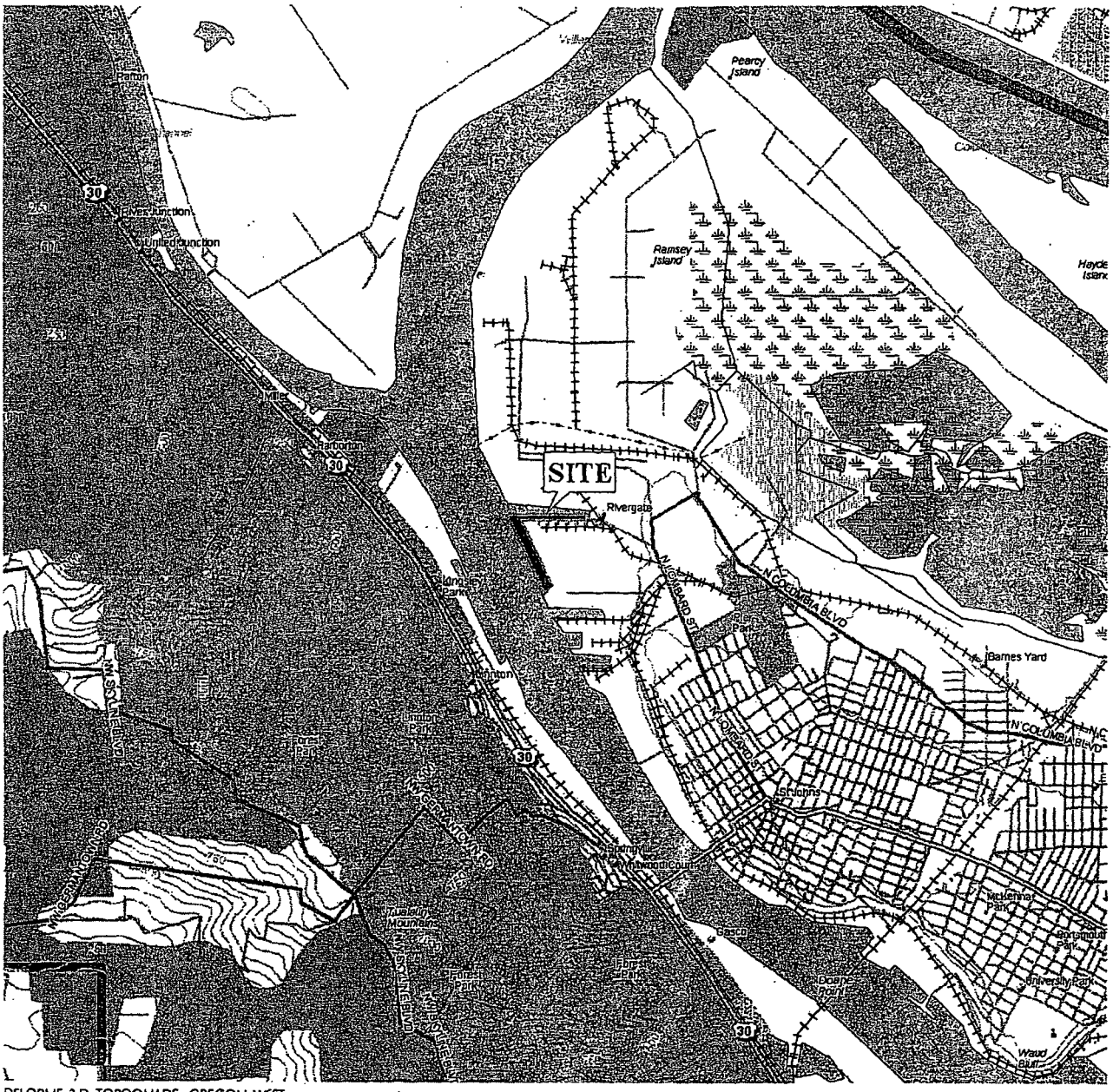
Please contact the undersigned if you have any questions regarding this report.

Submitted for GRI,

H. Stanley Kelsay, PE
Principal



Keith S. Martin, PE
Project Engineer



DELORME 3-D TOPOQUADS, OREGON WEST
LINNTON, OREG. (1ab) 1999

North

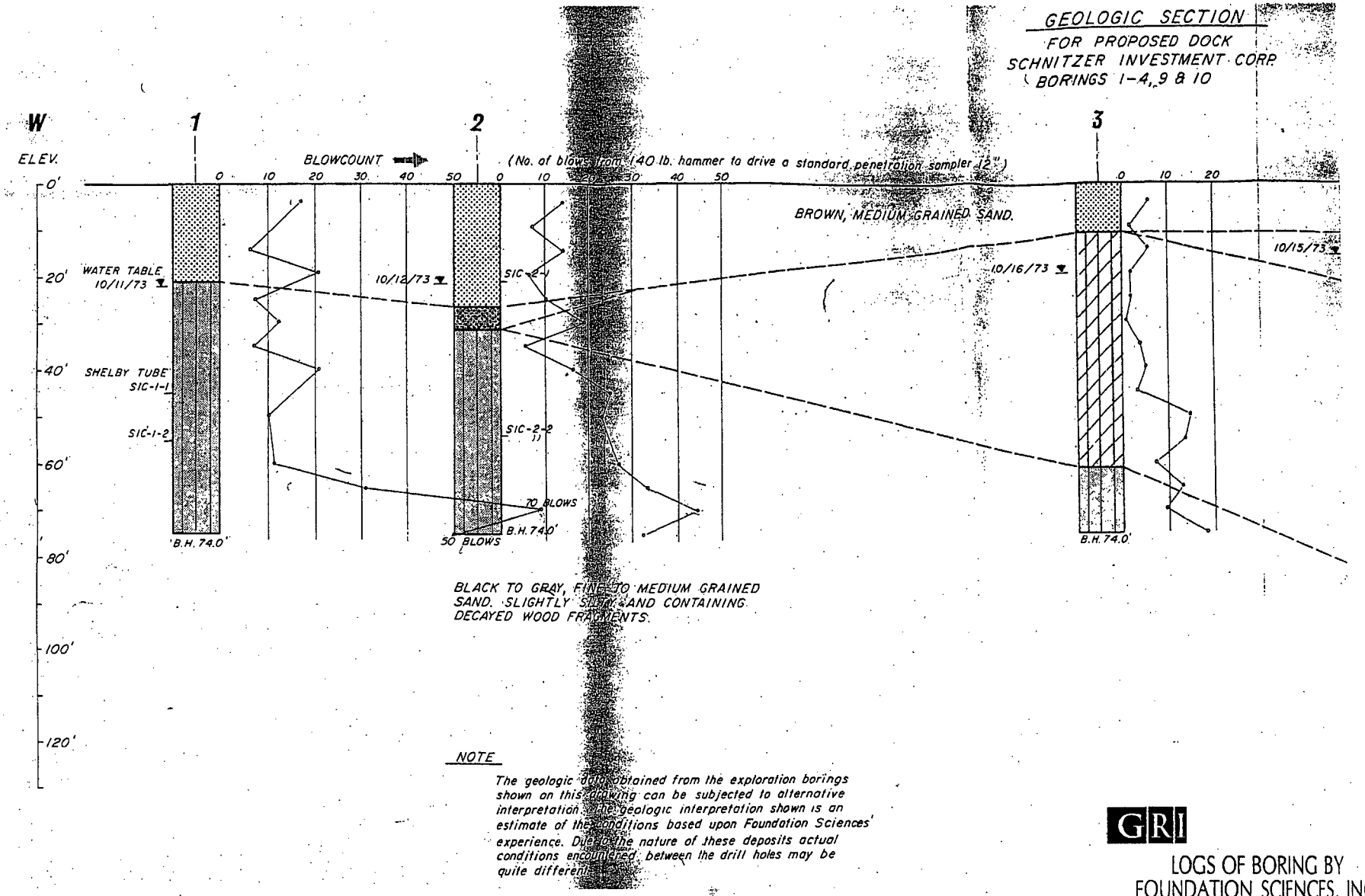
0 1 2 MILES

GRI PARSONS BRINCKERHOFF QUADE AND DOUGLAS
SCHNITZER STEEL SLOPE EVALUATION

VICINITY MAP

JUNE 2003 JOB NO. 3776 FIG. 1

SCHN00158170



NOTE

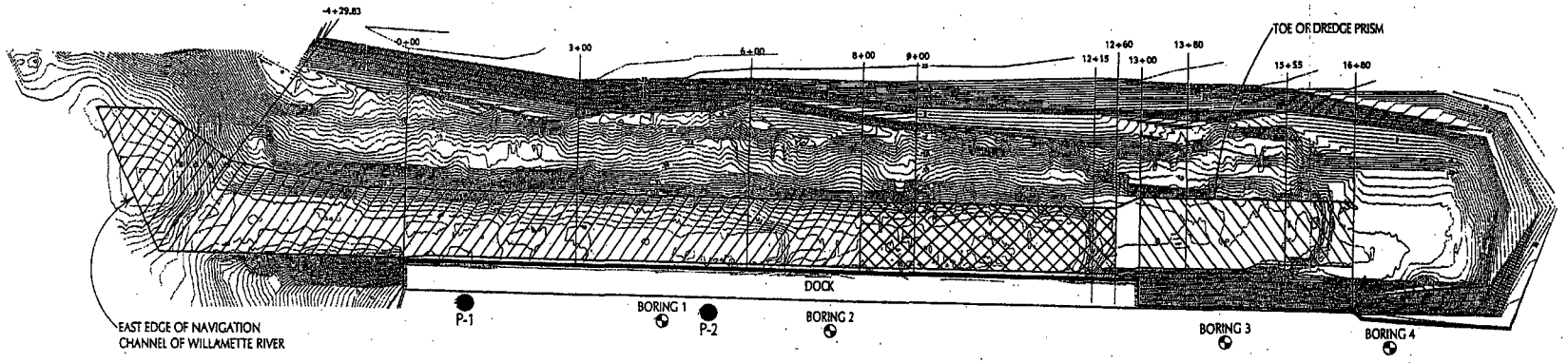
The geologic data obtained from the exploration borings shown on this drawing can be subjected to alternative interpretation. The geologic interpretation shown is an estimate of the conditions based upon Foundation Sciences' experience. Due to the nature of these deposits actual conditions encountered between the drill holes may be quite different.

GRI

LOGS OF BORING BY
FOUNDATION SCIENCES, INC.
(DECEMBER 1973)

JUNE 2003 JOB NO. 3776 FIG. 1A

SCHN00158171



STATIONS
BERTH 1: 0+00 TO 6+00
BERTH 2: 6+00 TO 13+80
BERTH 3: 13+80 TO 16+80

● CONE PENETRATION TEST MADE BY GRI (JUNE 13, 2002)

⊕ BORING MADE BY FOUNDATION SCIENCES, INC. (LOCATION APPROXIMATE; DECEMBER 1973)

DREDGE DEPTH CRD -42 FT

DREDGE DEPTH CRD -38 FT

DREDGE DEPTH CRD -24 FT

SITE PLAN FROM FILE BY PARSONS BRINCKERHOFF QUADE & DOUGLAS, INC. (UNDATED)

North

0 200 400 FT

GRI

PARSONS BRINCKERHOFF QUADE AND DOUGLAS
SCHNITZER STEEL SLOPE EVALUATION

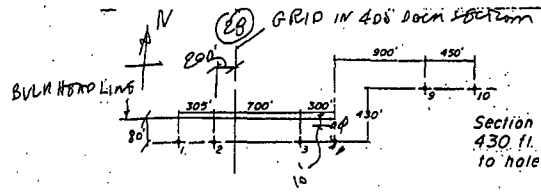
SITE PLAN
(SLIP)

JUNE 2003 | JOB NO. 3776 | FIG. 2

SCHN00158172

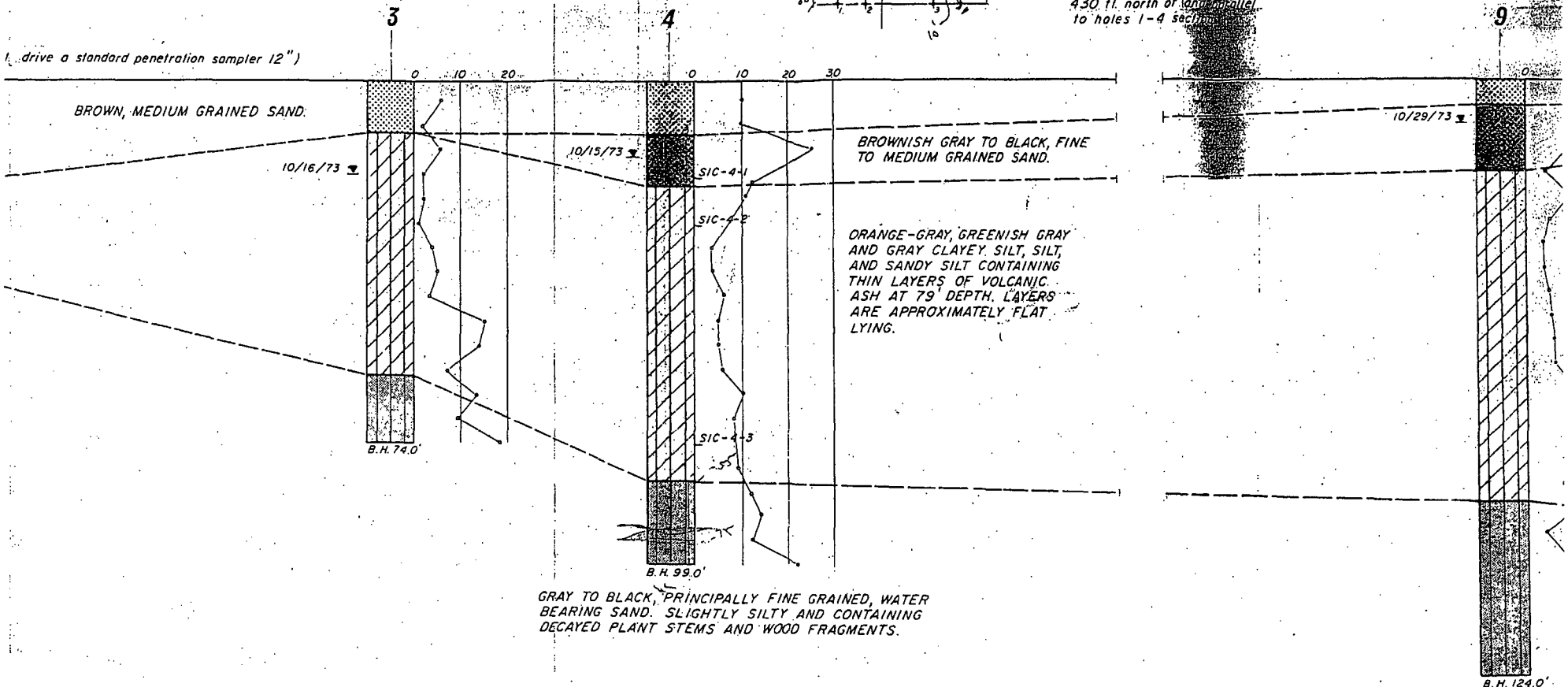
GEOLOGIC SECTION

FOR PROPOSED DOCK
SCHNITZER INVESTMENT CORP.
BORINGS 1-4, 9 & 10



Section thru holes 9 & 10, 430 ft. north of and parallel to holes 1-4 section

(drive a standard penetration sampler 12")



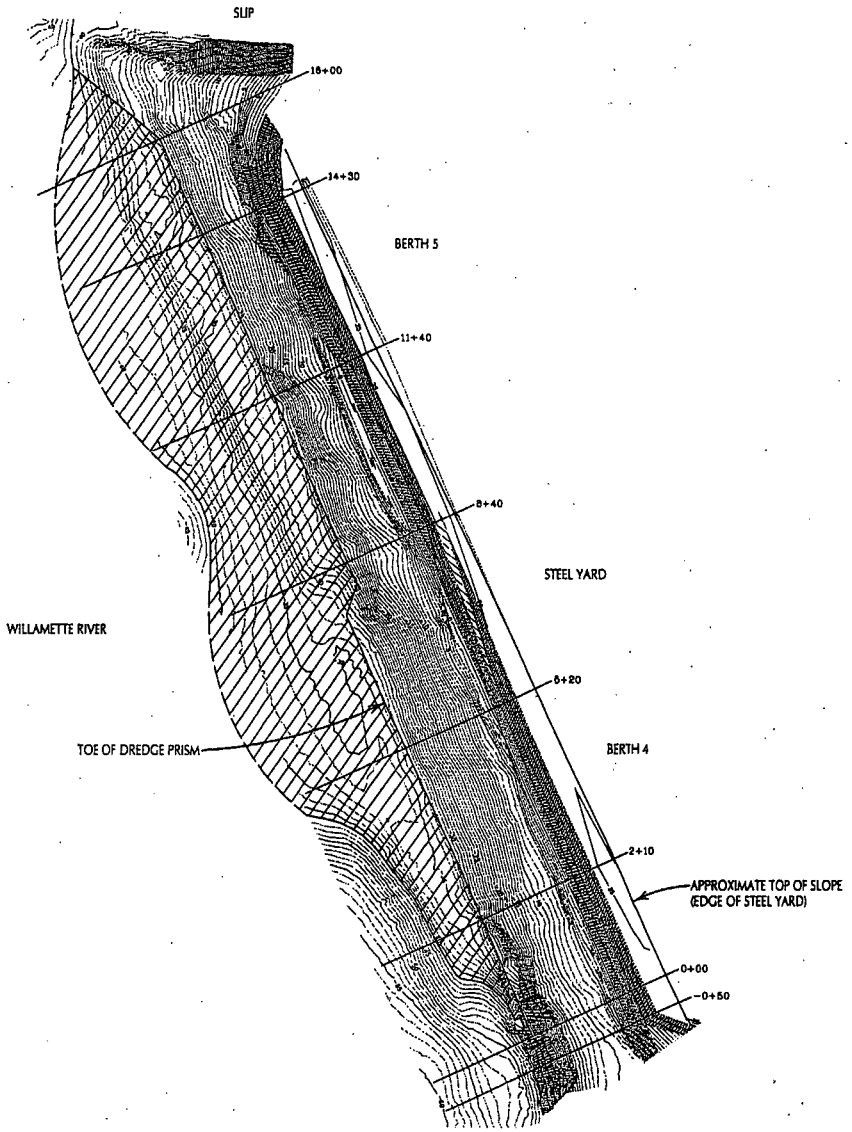
HORIZONTAL SCALE: 1"=100'

GRI

LOGS OF BORING BY
FOUNDATION SCIENCES, INC.
(DECEMBER 1973)

JUNE 2003 | JOB NO. 3776 | FIG. 2A

SCHN00158173



STATIONS
BERTH 4: 0+00 TO 8+00
BERTH 5: 8+00 TO 16+00

DREDGE DEPTH CRD -42 FT

SITE PLAN FROM FILE BY PARSONS BRINCKERHOFF QUADE & DOUGLAS, INC. (UNDATED)

North

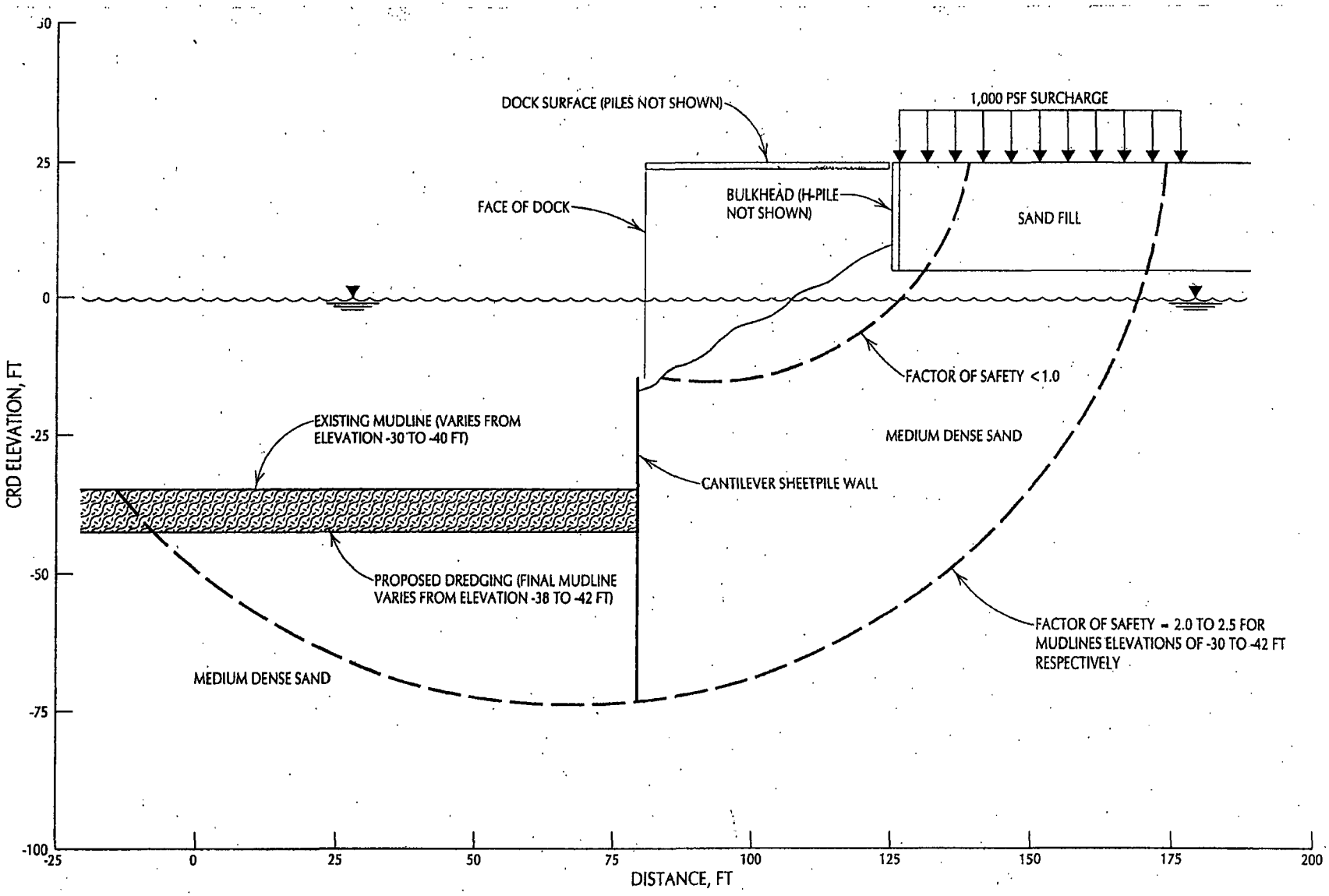
0 200 400 FT

GRI PARSONS BRINCKERHOFF QUADE AND DOUGLAS
SCHNITZER STEEL SLOPE EVALUATION

SITE PLAN
(RIVER)

JUNE 2003 JOB NO. 3776 FIG. 3

SCHN00158174



GRI

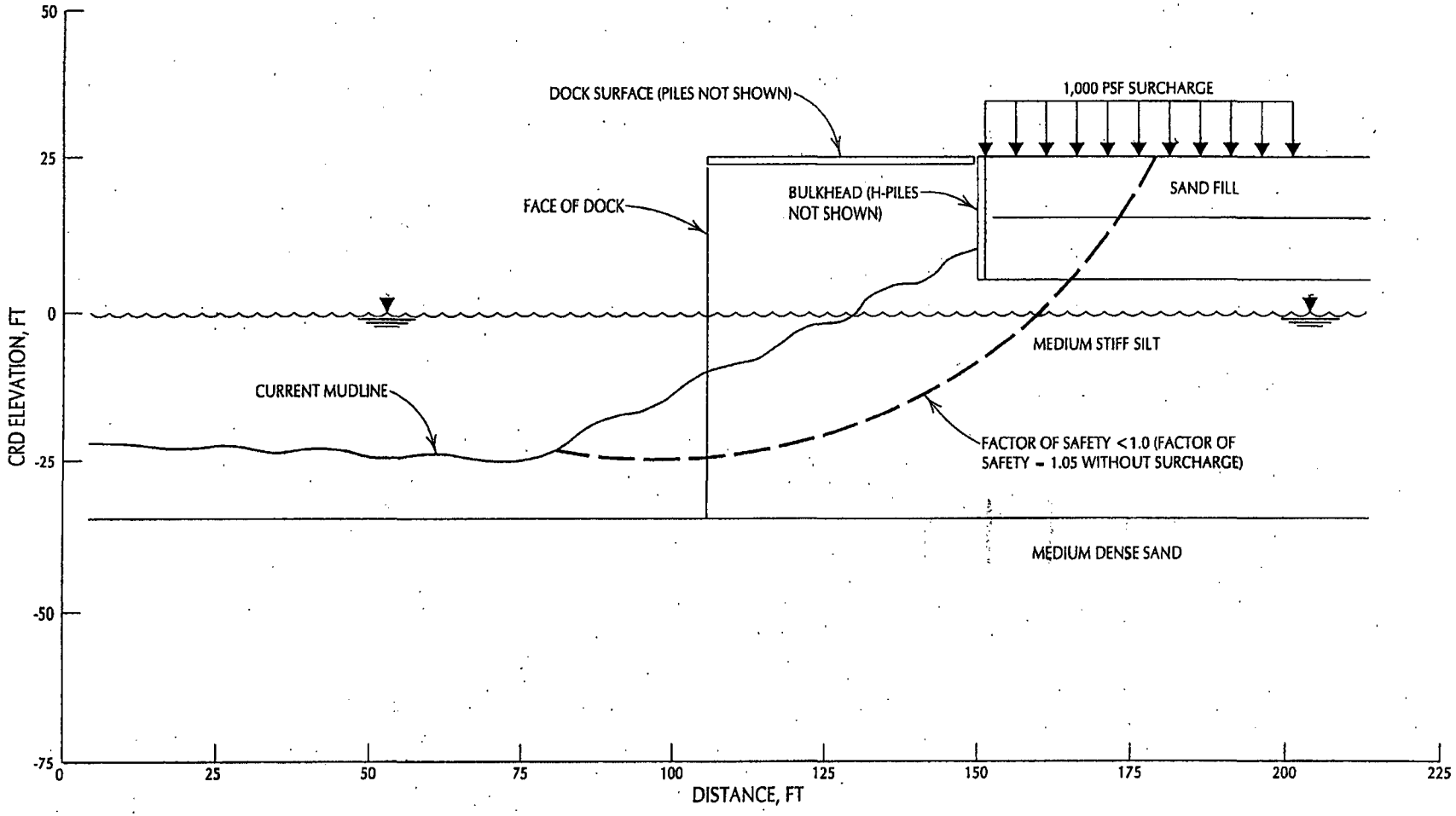
PARSONS BRINCKERHOFF QUADE AND DOUGLAS
SCHNITZER STEEL SLOPE EVALUATION

STABILITY ANALYSIS

(BERTHS 1 & 2)

JUNE 2003 JOB NO. 3776 FIG. 4

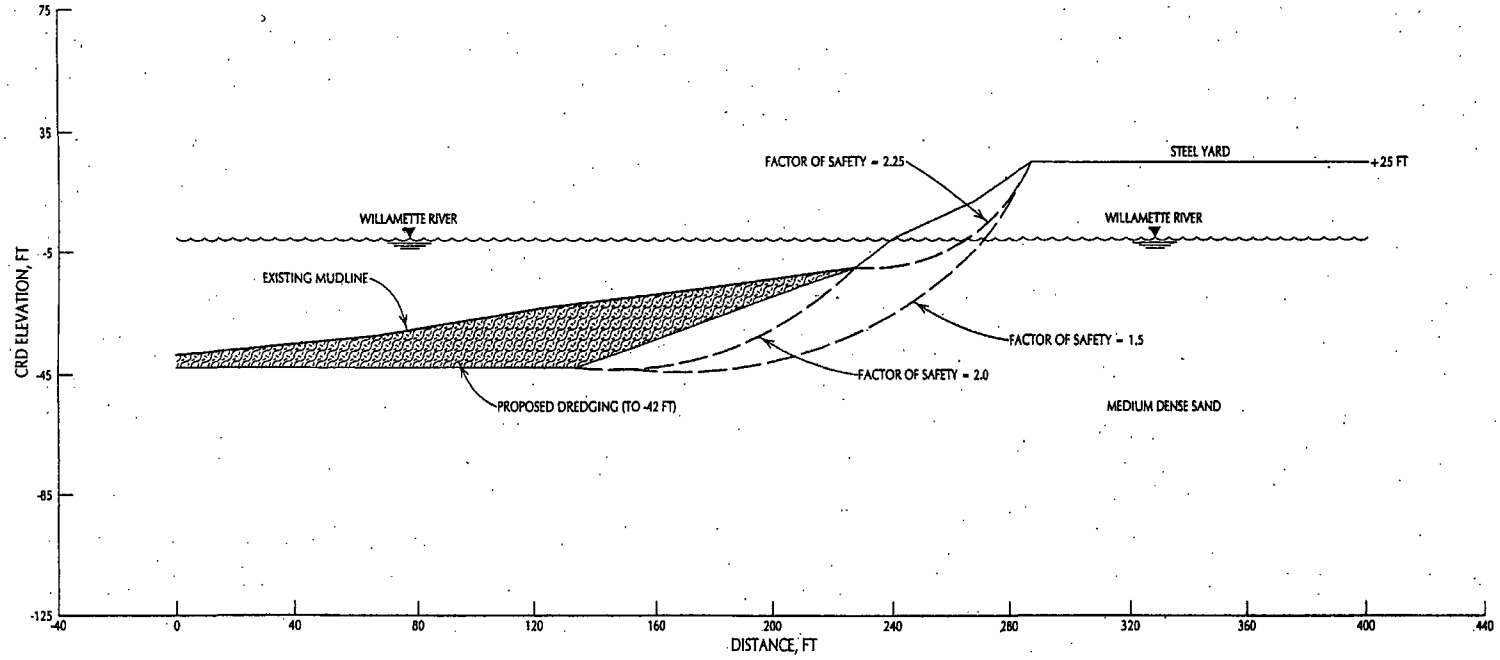
SCHN00158175



PARSONS BRINCKERHOFF QUADE AND DOUGLAS
SCHNITZER STEEL SLOPE EVALUATION

STABILITY ANALYSIS
(BERTH 3 EXISTING CONDITIONS)

JUNE 2003 JOB NO. 3776 FIG. 6



GRI PARSONS BRINCKERHOFF QUADE AND DOUGLAS
SCHNITZER STEEL SLOPE EVALUATION

STABILITY ANALYSIS

(BERTHS 4 & 5 TYPICAL SECTION)

JUNE 2003 JOB NO. 3776 FIG. 8

SCHN00158177

APPENDIX A

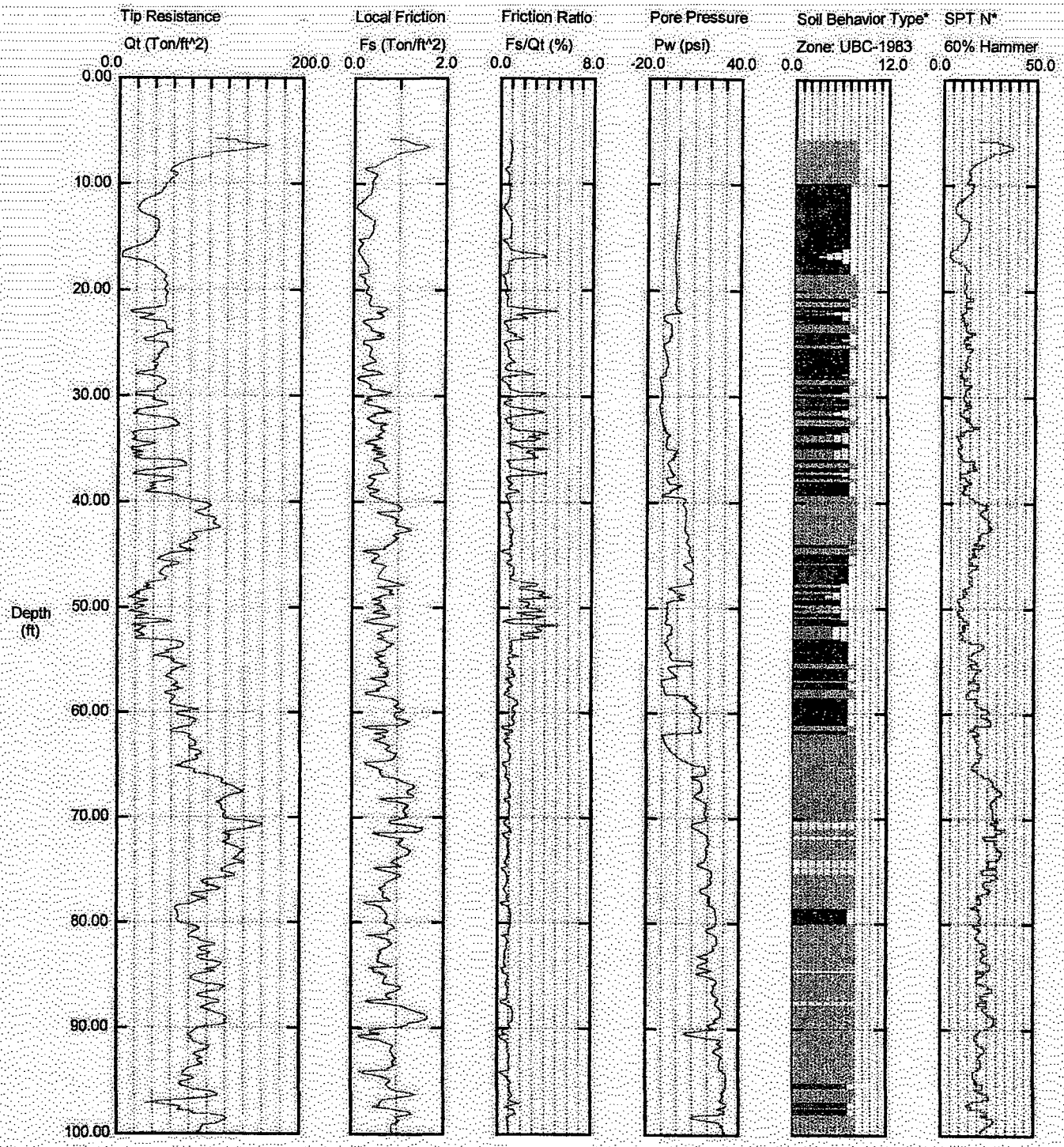
FIELD EXPLORATIONS

Subsurface Explorations

As discussed previously in this report, subsurface investigations were performed by GRI in 2002 and by FSI in 1973. As part of these investigations, subsurface explorations were performed.

The 1973 FSI investigation included six soil borings, designated Boring 1 through 4 and Borings 9 and 10. Logs of the borings are provided on Figures 1A and 2A. Borings 5 through 8 are located beyond the limits of this project and are provided in a separate FSI report. The logs provide a description of the materials encountered with depth and Standard Penetration N-values at selected depths to determine the relative density of granular soils and relative consistency of fine-grained soils.

To supplement the FSI borings, two electric cone penetration test (CPT) probes, designated P-1 and P-2, were performed in 2002 as part of the GRI investigation for the dock modifications as referenced previously in this report. Logs of the CPT probes are provided on Figures 3A and 4A. The CPT logs show the values of cone penetration resistance, sleeve friction, and friction ratio (i.e., sleeve friction divided by the cone penetration resistance) as a function of depth. The logs also provide an interpretation of the data with respect to the basic type of soil penetrated. Qualitative descriptions of relative consistency or density based on cone penetration resistance and sleeve friction are also provided on the logs.



Maximum Depth = 100.39 feet

Depth Increment = 0.16 feet

1 sensitive fine grained
2 organic material
3 clay
4 silty clay to clay
5 clayey silt to silty clay
6 sandy silt to clayey silt
7 silty sand to sandy silt
8 sand to silty sand
9 sand
10 gravelly sand to sand
11 very stiff fine grained (*)
12 sand to clayey sand (*)

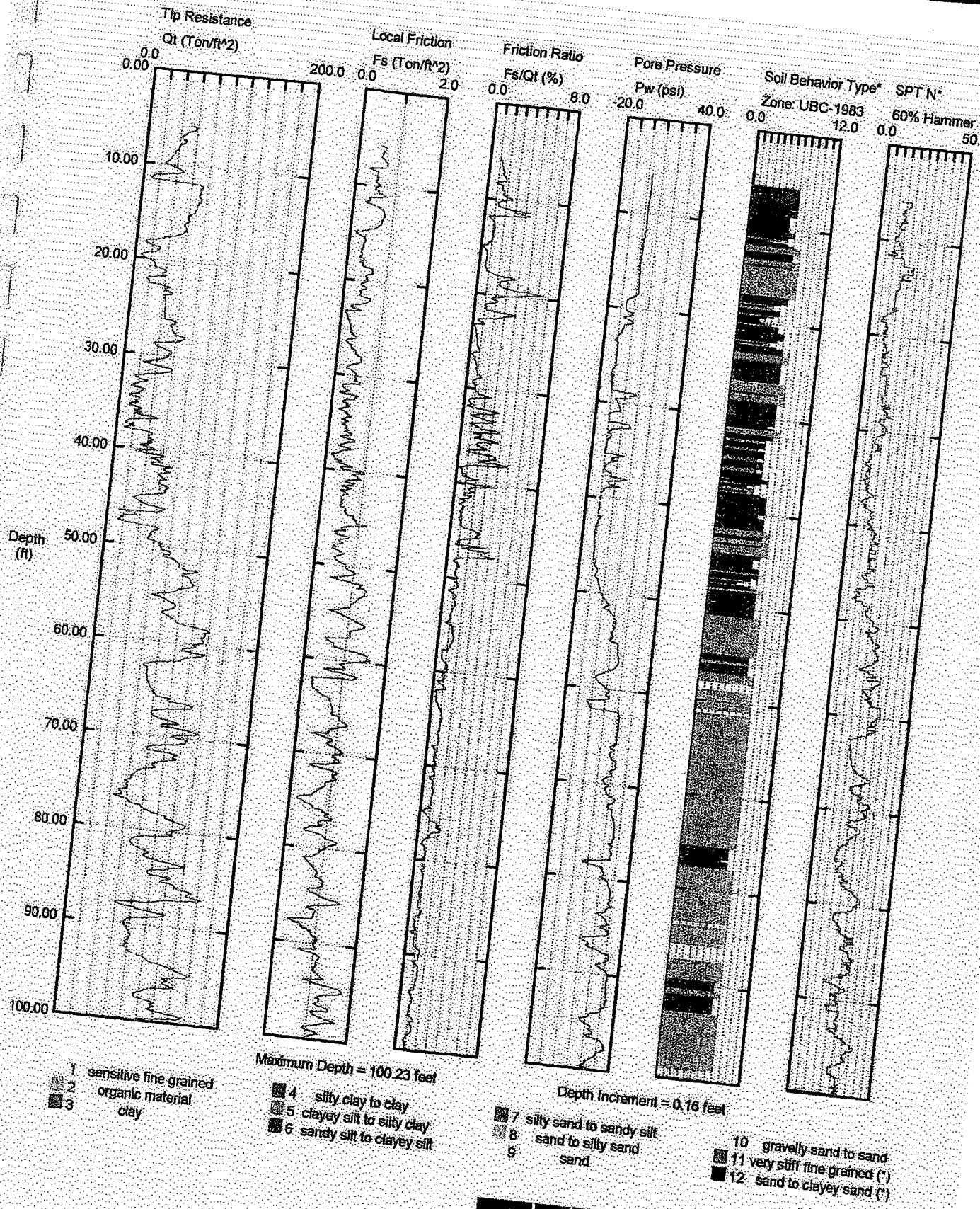
GRI

CONE PENETRATION TEST P-1

BY GRI (OCTOBER 2002)

JUNE 2003 JOB NO. 3776 FIG. 3A

SCHN00158179



Maximum Depth = 100.23 feet

Depth Increment = 0.16 feet

GRI

CONE PENETRATION TEST P-2

BY GRI (OCTOBER 2002)

JUNE 2003 JOB NO. 3776 FIG. 4A

SCHN00158180